BOTANICA

LOS HONGOS DE COLOMBIA — VII: LEOTIACEAE — IV: *HYMENOSCYPHUS CAUDATUS* AND RELATED SPECIES FROM COLOMBIA AND ADJACENT REGIONS

By

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SUMMARY

The present paper redescribes and illustrates five common species of *Hymenoscyphus*, *H. caudatus*, *H. serotinus*, *H.* affin. *scutulus*, *H. lasiopodium* & *H. sclerogenus*, from Colombia and adjacent regions in South America. Emphasis is given to discussions of anatomical and morphological variability and host specificity of the species included.

Inoperculate Discomycetes are generally small Ascomycetes producing an apothecium as their sexual fruiting structure. The largest order, the Helotiales, contains 5 families: Dermateaceae, Hyaloscyphaceae, Orbiliaceae, Sclerotiniaceae and Leotiaceae. In recent years there have been several monographic and submonographic studies on selected genera within these families, but no definitive studies on the principal family, Leotiaceae (previously referred to as the Helotiaceae), has been prepared. These studies have resulted in a better understanding of some of the family limits, but most of the generic limits still remain vague and confused. This is especially true for *Hymenoscyphus* (previously referred to by most workers as *Helotium*), which for decades has been the depository for small Discomycetes of uncertain affinities.

White (1942, 1942-a, 1943, 1944) began to work systematically through the species of *Hymenoscyphus* and to bring order out of the existing chaos. His carefully prepared descriptions, meticulously drawn illustrations, and long synonymies were the real important contribution to the understanding of the genus. The most recent attempts to study *Hymenoscyphus* have been by

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Dennis, who summarized his works in 1964 (Dennis, 1964). However, as Dennis himself points out, he was unable to come to a sound understanding and arrangement of the species because of the extent of the problems, and the resulting treatment is rather artificial. He relied heavily upon substrate and geographical relations, rather than true morphological similarities. We agree with Dennis, that this has resulted in the separation of closely related taxa and an "unnecessary proliferation of names".

Although Dennis contributions were extraordinary in terms of the number of described species he examined and in his literature searches, he did not have at his disposal necessary tropical collections for a complete comprehension of the individual species and/or the entire genus. Further, as pointed out by Dumont (1976), because of limited collections Dennis was unable to understand the full morphological and geographical variation of certain species and recognized several taxa, when in the final analysis only one existed. Many of these deficiencies are apparent in his monumental work on "The Fungus Flora of Venezuela and Adjacent Countries" (Dennis, 1970). In *Hymenoscyphus* for example, he included only seven species (in his 1964 treatment he included more than 70 species for the world), and of these three, *H. crocatus, H. caracassensis and H. atrosubiculatum* have been removed from the genus by Dumont (1974) and Dumont and Pal (1978).

Arendholz (1979) has recently provided a very important contribution to the understanding of several species of leaf inhabiting species of *Hymenoscyphus*. Again, as with previous workers, his work stressed temperate collections and temperate species.

The purpose of the present study is to report the findings of some of our tropical collecting, to expand the understanding of five species of *Hymenoscyphus* which appear to be common in northern South America, to discuss the morphological variability observed, and to comment on the host or substrate specificity (or lack of it) within certain taxa.

The materials and methods used during these studies are the same as those reported by Dumont (1972). The following is a key to the five species reported herein.

KEY TO SPECIES OF *HYMENOSCYPHUS* STUDIED

1. Ascospores septate (50% spores or more)

    2. Ascus apex papillate, ascospores with "nuclear area" staining in cotton blue, ascospores (22-) 26-30 (-35) x 3-4 (-6) µm . . . . *H. sclerogenus.*

2. Ascus apex broadly truncate, ascospores without "nuclear area" staining in cotton blue, ascospores (20-) 24-30 (-35) x 4-5 (-6) µm . . . . *H. lasiopodium.*

1. Ascospores non-septate

   3. Ascospores with a basal cilium (16-) 18-22 (-26) x 2-3 (-4) µm . . . . *H.* affin. *scutulus.*

   3. Ascospores lacking a cilium

      4. Ascospores hooked apically

         5. Ascospores strongly and obviously hooked, tapering gradually to the base (16-) 18-23 (-30) x 3-3.5 (-4.5) µm . . . . *H. serotinus.*

         5. Ascospores, if hooked, only slightly and only a few per mount, abruptly pointed at basal end (-14) 16-23 (-26) x 4-5 (-6) µm . . . . *H. caudatus.*

      4. Ascospores not hooked apically

         6. Ascospores (14-) 16-23 (-26) x 4-5 (-6) µm, anterior end rounded, no nuclear staining area . . . . . . *H. caudatus.*

         6. Ascospores (22-) 26-30 (-35) x 3-4 (-6) µm, ends pointed, with nuclear staining area . . . . *H. sclerogenus.*

INCLUDED SPECIES

1. **Hymenoscyphus caudatus** (Karsten) Dennis, Persoonia, 3: 76. 1964.

Basionym: *Peziza caudata* Karsten, Fungi fenn. exs. 547. 1866.

Apothecial morphology. Apothecia variable, solitary or gregarious, stipitate, 0.75-1.0 mm in diam, 0.5-.75 mm high, when fresh, disc flat to concave, drying concave, flat to convex, rehydrating flat. Hymenium when fresh white to pale yellow, drying straw-yellow to pale yellow-orange, rehydrating translucent, light yellow to flesh color; margin when fresh, dry and rehydrated concolorous with hymenium; receptacle when fresh concolorous with hymenium or lighter, drying generally slightly darker than hymenium, rehydrating pallid to pale flesh color; stipe cylindrical, broader above and tapering slightly toward the base, when fresh, dry and rehydrated concolorous throughout with lower portion of receptacle.

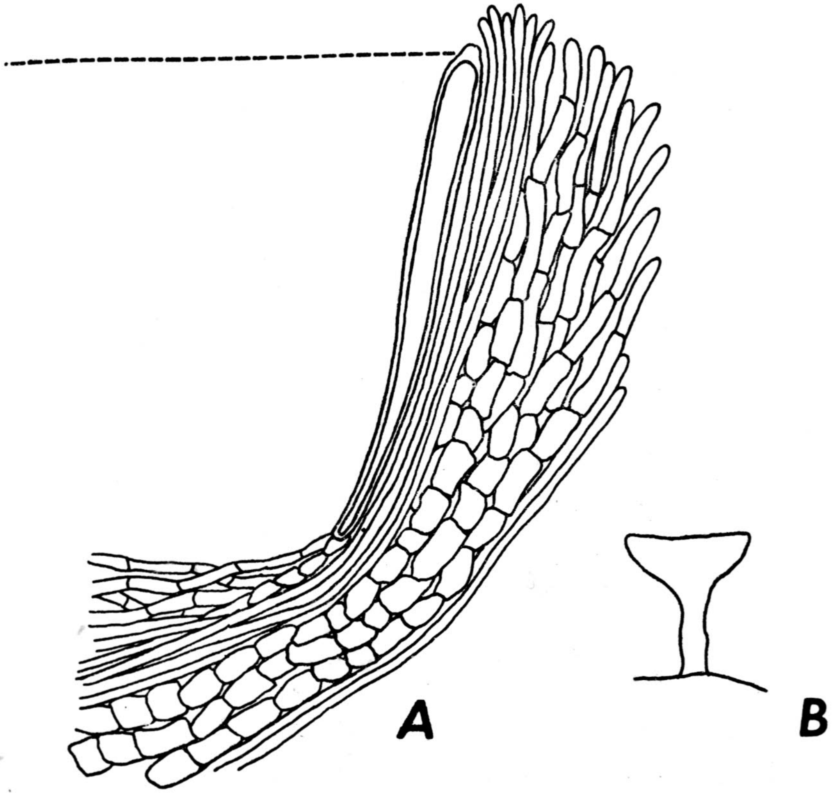

FIG. 1. *Hymenoscyphus caudatus,* Dumont-CO 484, freehand drawings of median longitudinal sections of apothecia. A. Margin with immature ascus, x 1.000. B. Whole apothecium, x ca 20.

Apothecial anatomy. Asci 8-spored, (90-) 105-140 (-150) x 8-12 (-15) µm, produced from obvious croziers, long clavate, gradually tapering to the base and there truncate; wall 1-2 µm thick, enlarged at the narrowly to broadly papillate apex and there to 5 µm thick; pore wall J +, the walls outlined blue in Melzer's reagent. Ascospores (14-) 16-23 (-26) x 4-5 (-6) µm, irregularly biseriate throughout, biseriate above and uniseriate bellow, hyaline, smooth, aseptate or rarely 1-septate, ellipsoid, subfusoid to ovoid, apical end rounded and frequently slightly hooked, the basal end pointed; in outline inequilateral, frequently flattened on one surface, anterior end slightly broader, generally with 2 large, irregular guttules and 1-several smaller associated ones. Paraphyses equal to or exceeding the asci by 10-15 µm, internally hyaline, branching rarely at the base of the asci, septate, filiform, at the apex 1-2 µm wide, walls thin, smooth. Subhymenium not well differentiated from medullary excipulum, well developed, hyaline to light gray in the center ca 20-60 µm wide, consisting of generally tightly compact, parallel, vertically oriented hyphae, the individual hyphae hyaline, 1-2 µm wide, the walls thin, smooth. Medullary excipulum well developed, obconical, non-refractive, hyaline, consisting of septate, branched, loosely to tightly interwoven (to parallel in the flanks and toward the margin) hyphae 2-4 (-5) µm wide, the walls thin, non-refractive, hyaline, smooth. Ectal excipulum: inner ectal excipulum poorly defined and differentiated from the medullary excipulum, entire layer non-refractive, hyaline, to 8 µm wide toward the margin and to 24 µm toward the stipe, consisting of tightly to loosely compact, parallel to slightly interwoven, hyaline hyphae 1-3 µm wide, the walls thin, smooth. Outer ectal excipulum generally non-refractive, non-gelatinized, entire layer hyaline, ca 12-22 µm broad toward the margin, ca 16-23 µm broad toward the stipe, consisting predominately of textura prismatica with the individual hyphae extending parallel to the surface of the apothecium; the individual cells toward the margin 4-16 x 3-7 µm, 5-22 x 3-8 µm toward the stipe, the walls thin or less commonly thick, hyaline, smooth.

Outer covering layer present, occasionally becoming detached from the surface of apothecium and appearing naked, consisting of 1-2 hyphal layers and 2-6 µm broad, the individual hyphae extending parallel to the surface of the apothecium, overlapping terminating before the margin; the individual cells hyaline, the walls non-refractive, thin, smooth to rarely rough. Hairs absent. Margin poorly developed, very narrow above, broader below, entire area hyaline to subhyaline, consisting of rectangular cells originating in the outer ectal excipulum below, but terminating before the tips of the asci and then composed of narrow hyphae originating in the inner ectal excipulum. Stipe constructed similarly to the lower portion of the apothecial flank; base of stipe becoming pink in Melzer's reagent; hairs present and most obvious toward base, to 10 μm long, 2-4 (-5) μm wide, the walls thin to thick, subhyaline to pigmented, smooth to finely roughened.

Habitat. Generally found on leaves and leaf parts and rarely on herbaceous stem.

Holotype. Karsten, Fungi fenn. exs. 547 (not examined).

Selected illustrations. White, Farlowia 1: 153, fig. 8, 1943. Dennis, Mycol. Pap. 62: 82, fig. 74, 1956.

Specimens examined. MEXICO: Oaxaca, between km 130-131, Highway 175, between Oaxaca and Puerto Angel, on leaves, 11 Aug. 1967, *K. P. Dumont CUP-ME 169* (CUP, NY); Chiapas, 3-4 mi N of junction to Simojovel, on road between Tuxula Gutiérrez and Villahermosa, on leaf, 19 Aug. 1967, *K. P. Dumont CUP-ME 276* (CUP, NY). COLOMBIA: Dpto. Antioquia, ca 102 km from Medellín, on the Medellín-Pto. Valdivia Rd, ca 8.200 ft, on leaves, 12 Aug. 1976, *K. P. Dumont, S. E. Carpenter & M. A. Sherwood CO-6235* (COL, NY); Dpto. Boyacá, along the Tunja-Ramiriquí-Páez Rd, in the vicinity of km post 20 from the crossing of the Tunja-Nuevo Colón Rd, ca 9.800 ft, on leaves, 14 Sep. 1976, *K. P. Dumont, P. Buriticá & M. I. Umaña CO-7979* (COL, NY). VENEZUELA: Edo. Mérida, El Pino, 16 km E of Apartaderos, on the Mérida-Barinas Rd, on leaves, 19 Jul. 1971, *K. P. Dumont, J. H. Haines, & G. L. Samuels VE-2475* (NY, VEN); Edo. Mérida, ca 63 km W of Mérida, Univ. Los Andes Forest Reserve, La Carbonera, on leaf, 20 Jul. 1971, *K. P. Dumont, J. H. Haines, G. J. Samuels, S. Silverborg & L. Borjas VE-2638* (NY); Edo. Miranda, vicinity of refugio "No te Apures", S slope facing slope of La Silla, Parq. Nac. El Avila, on leaf, 30 Jun. 1972, *K. P. Dumont, G. J. Samuels & B. Manara VE-3795* (NY); Edo. Miranda, vicinity refugio "No Te Apures", S facing slope of La Silla, Parq. Nac. El Avila, on leaf, 30 Jun. 1972, *K. P. Dumont, G. J. Samuels & B. Manara VE-3806* (NY); Dto. Fed. trail from Quebrada Maripérez through Vivero El Cuño and El Papelón to ca 1 km below Hotel Humbolt, Parq. Nac. El Avila, on leaf, 27 Jul. 1972, *K. P. Dumont, R. F. Cain & G. J. Samuels VE-6185* (NY); Edo. Miranda, vicinity of El Arado, ca 12 km SW of Macarao, on leaf, 28 Jul. 1972, *K. P. Dumont, R. F. Cain, G. J. Samuels & G. Morillo VE-6295* (NY, VEN). ECUADOR: Prov. Pichincha, ca 39 km SW of Chillogallo, on the old road from Quito to Sto. Domingo, ca 7.200 ft, on leaf, 17 Jul. 1975, *K. P. Dumont, S. E. Carpenter & P. Buriticá EC-189* (NY); Prov. Pichincha, ca 39 km SW of Chillogallo, on the old road from Quito to Sto. Domingo, ca 7.200 ft, on leaf, 17 Jul. 1975, *K. P. Dumont, S. E. Carpenter & P. Buriticá EC-234* (NY); Prov. Pichincha, ca 49 km SW of Chillogallo, on the old road from Quito to Sto. Domingo, ca 7.200 ft, on leaf, 17 Jul. 1975, *K. P. Dumont, S. E. Carpenter &*

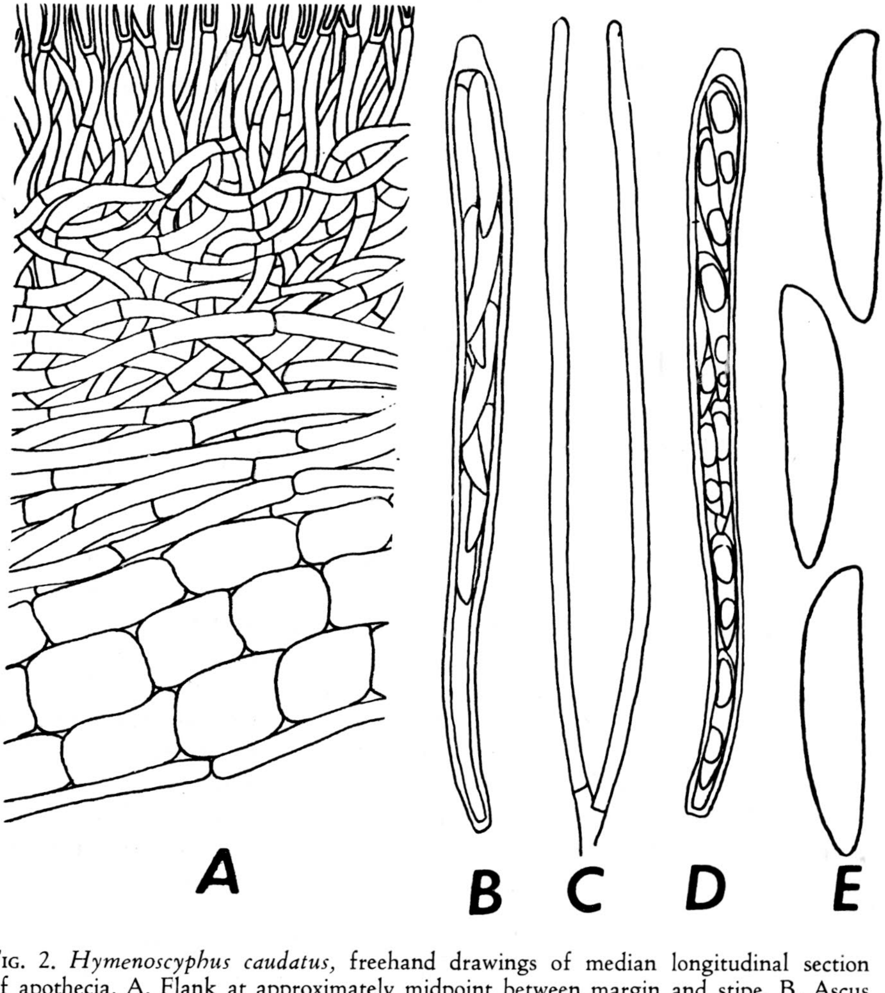

FIG. 2. *Hymenoscyphus caudatus,* freehand drawings of median longitudinal section of apothecia. A. Flank at approximately midpoint between margin and stipe. B. Ascus with 8 mature, biseriate ascospores. C. A branching paraphysis. D. Ascus with 8 uniseriate ascospores younger than B. E. Three mature ascospores. A-D, x 1.000; E, x 2.000. A, Dumont-CO 484. B-E, Dumont-VE 2638.

P. Buriticá EC-286 (NY); Prov. Pichincha, ca 24 km from the junction of the Quito-Machachí Rd, on the new road from Quito to Sto. Domingo, ca 8.900 ft, on leaf, 7 Aug. 1975, *K. P. Dumont & P. Buriticá EC-2364* (NY); Prov. Pichincha, ca 24 km from the junction of the Quito-Machachí Rd, on the new road from Quito to Sto. Domingo, ca 8.900 ft, on leaf, 7 Aug. 1975, *K. P. Dumont & P. Buriticá EC-2365* (NY). PERU: Dpto. Junín, ca ½ hr. drive from Calabaza toward Concepción, on the Satipo-Concepción Rd, ca 7.000 ft, on leaf, 28 Jun. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood & P. Buriticá PE-347* (NY, USM); Dpto. Junín, ca 135 km from Huancayo, on the Satipo-Huancayo Rd, ca 10.800 ft, on leaf, 9 Jul. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood & P. Buriticá PE-1223* (NY, USM); Dpto. Cuzco, along the Cuzco-Pilcopata-Paucartambo Rd, at a point ca 132 km from the intersection with the Cuzco-Puno Rd, on leaf, 19 Jul. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood & P. Buriticá PE-1822* (NY, USM); Dpto. Cuzco, along the Cuzco-Pilcopata-Paucartambo Rd, at a point ca 133 km from the intersection with the Cuzco-Puno Rd, on leaves, 19 Jul. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood & P. Buriticá PE-1859* (NY, USM); Dpto. Cuzco, along the Cuzco-Pilcopata-Paucartambo Rd, at a point ca 132 km from the intersection with the Cuzco-Puno Rd, on leaves, 19 Jul. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood & P. Buriticá PE-1873* (NY, USM).

Notes. In Dennis' concept (Dennis 1956, 1964) of *Hymenoscyphus caudatus,* the apothecia are small, white to yellowish, found only on leaves and have ascospores 15-21 x 4-5.5 μm. Although he collected extensively in Venezuela, Dennis did not report the species from Venezuela. White (1943) treated *H. caudatus* and indicated "... [H. caudatum] is doubtfully distinct from *H. scutulus...*". According to White. *H. caudatus* has spores 18-25 x 4.5-5.5 μm, and grows only on leaves, while *H. scutulus* generally has spores with a basal cilium and grows on herbaceous stems. Although we have not examined the type specimen of *H. caudatus,* we have concluded from a comparison of specimens and literature that our material does fall into the current concept of that species as conceived by Dennis and White.

Our material of *Hymenoscyphus caudatus* appears to be closely related to *Hymenoscyphus serotinus* as here defined (see below). Both have a similar ectal excipulum and a papillate ascus apex. Many of the collections of *H. serotinus* can be separated from *H. caudatus* on gross morphological features. The apothecia of *H. serotinus* are larger and vary from orange to dark colors and occur on several substrata. Collections of *H. serotinus* with yellow apothecia growing on leaves can best be separated from those of *H. caudatus* by the shape of their ascospores. In *H. serotinus* the ascospores are strongly hooked apically, curve, and taper gradually from the apex to the posterior end. The ascospores of *H. caudatus* are more robust, if hooked apically only very slightly and not curved, generally flattened on one side, with the anterior end rounded and posterior end abruptly pointed. Occasionally we have noted that narrow ascospores of *H. caudatus* do approach those of *H. serotinus* and that the broader ascospores of *H. serotinus* approach those of *H. caudatus*. In general, the two species are then most easily separated by the shape of their ascospores which generally remains constant. However, we have found one collection, Dumont CO-1782, which appears to be intermediate between the two. Until further investigations can be conducted on the world-wide variability of these species, we will continue to maintian them as distinct species, but do stress their obvious close relationship.

We are reporting here a species, "*Hymenoscyphus* affin. *scutulus*", which seems to be closely related to *H. serotinus* and *H. caudatus*, and which occurs on herbaceous stems and leaves. Our material of *H.* affin. *scutulus* is distinguished from the other two by the presence of a cilium in the posterior end of the ascospore. In fact, except for the presence of this cilium this taxon is almost indistinguishable from *H. serotinus*. The ascospores of *H.* affin. *scutulus* are (16-) 18-22 (-26) x 2-3 (-4) µm, while in our material of *H. caudatus* and *H. serotinus* they are respectively: (14-) 16-23 (-26) x 4-5 (-6) µm and (16-) 18-23 (-30) x 3-3.5 (-4.5) µm.

In contrast to other species studied in this work, the apothecial morphology of *Hymenoscyphus caudatus* is relatively consistent. In general the apothecia are tiny (less than 1 mm), white, off white to pale yellow, and are found almost always on leaves (once on herbaceous stems). The apothecial anatomy of this species is also very consistant, with normal, expected variation observed. As with the other species reported in this paper, the range of ascospore measurements is wider than those reported in the literature. In fact, we have two Colombian collections. *Dumont* CO-484, 3336 which are in all respects the same as *H. caudatus*, but the asci and ascospores are consistantly smaller than the remaining material. However, we accept this variation and consider it merely to represent extreme measurements for a single species.

Additional specimens cited. COLOMBIA: Dpto. Cundinamarca, Páramo de Choachí, road between Bogotá and Choachí, on herbaceous stem, 2 Jul. 1974, *K. P. Dumont, J. H. Haines & J. M. Idrobo CO-484* (COL); Dpto. Antioquia, Estación Forestal Experimental Piedras Blancas, Medellín, on leaf, 21 Jul. 1974, *K. P. Dumont & J. H. Haines CO-1782* (COL, NY); Dpto. Nariño, Univ. de Nariño Property, 3.5 mi from a point 7 km from Pasto, on the Pasto-Ipiales Rd, ca 9.500 ft, on leaf, 24 Jan. 1976, *K. P. Dumont, J. L. Luteyn & L. A. Molina CO-3336* (COL, NY).

2. **Hymenoscyphus serotinus** (Persoon ex Fries) Phillips, British Discom. p. 125. 1887.

Basionym: *Peziza serotin*a Persoon, Syn. Meth. Fung. p. 661. 1801.

= *Peziza serotina* Pers. ex Pers., Mycol. Eur. *1:* 292. 1822.

Apothecial morphology. Apothecia very variable, solitary to gregarious, usually arising in association with of from midviens of leaves, stipitate, generally less than 1 mm (rarely to 5 mm) in diam, 0.5-.75 (-5) mm high, when fresh disc flat to convex, drying flat to concave, rehydrating flat to slightly concave. Hymenium when fresh yellow, light orange-yellow, beige, drying flesh color, yellow-orange, vinaceous to black, rehydrating pallid to flesh or slightly darker; margin when fresh, dry or rehydrated concolorous with hymenium; receptacle when fresh concolorous with hymenium or lighter, drying lighter than margin, pallid to pale vinaceous to light beige, rehydrating lighter; stipe cylindrical, broader above and tapering slightly towar the base, when fresh, dry or rehydrated concolorous with lower portion of receptacle, frequently hairy at the base.

Apothecial anatomy. Asci 8-spored, (75-) 90-117 (-120) x (5-) 6-8 (-10) μm, produced from small croziers, long cylindric-clavate, gradually tapering to the base and there truncate, wall 1-2 μm thick, enlarged at the papillate to subtruncate apex and there 2-3 (-4) μm thick, pore wall J +, the walls outlined blue in Melzer's reagent, two lines also visible in cotton blue. Ascospores (16-) 18-23 (-30) x 3-3.5 (-4.5) μm, biseriate throughout or biseriate above and uniseriate below, hyaline, smooth, aseptate, clavate, anterior ends rounded, in outline inequilateral, flattened on one surface, anterior end slightly broader, curved and hooked, posterior end becoming drawn out and pointed; guttules spherical to irregularly shaped, generally filling major portion of spores and separated by a narrow band of cytoplasm. Paraphyses equal to or slightly exceeding the asci, internally hyaline or rarely pigmented yellow to light brown, rarely branching at the base of the asci, sparingly septate, filiform, becoming slightly expanded at the apex and there 1-2 μm wide, walls thin, smooth, hyaline. Subhymenium not well differentiated from medullary excipulum, well to poorly developed, hyaline to light gray in the center to ca 55 μm, consisting of interwoven, parallel or vertically oriented hyphae, the individual hyphae hyaline to light gray 1-2 μm wide, the walls thin, smooth. Medullary excipulum well to poorly developed, obconical, non-refractive, hyaline, consisting of septate, branched, loosely to tightly interwoven (to parallel in the flank and toward the margin), hyphae (1-) 2-4 μm, wide, the walls thin, non-refractive, smooth. Ectal excipulum: inner ectal excipulum well to poorly defined, well differentiated from the outer ectal excipulum and grading into medullary excipulum, entire layer non-refractive, hyaline, to ca 10 μm wide toward the margin and to 23 μm toward the stipe, consisting of tightly compact, parallel to slightly interwoven, hyaline hyphae 2-4 μm wide, the walls thin, non-refractive, smooth. Outer ectal excipulum

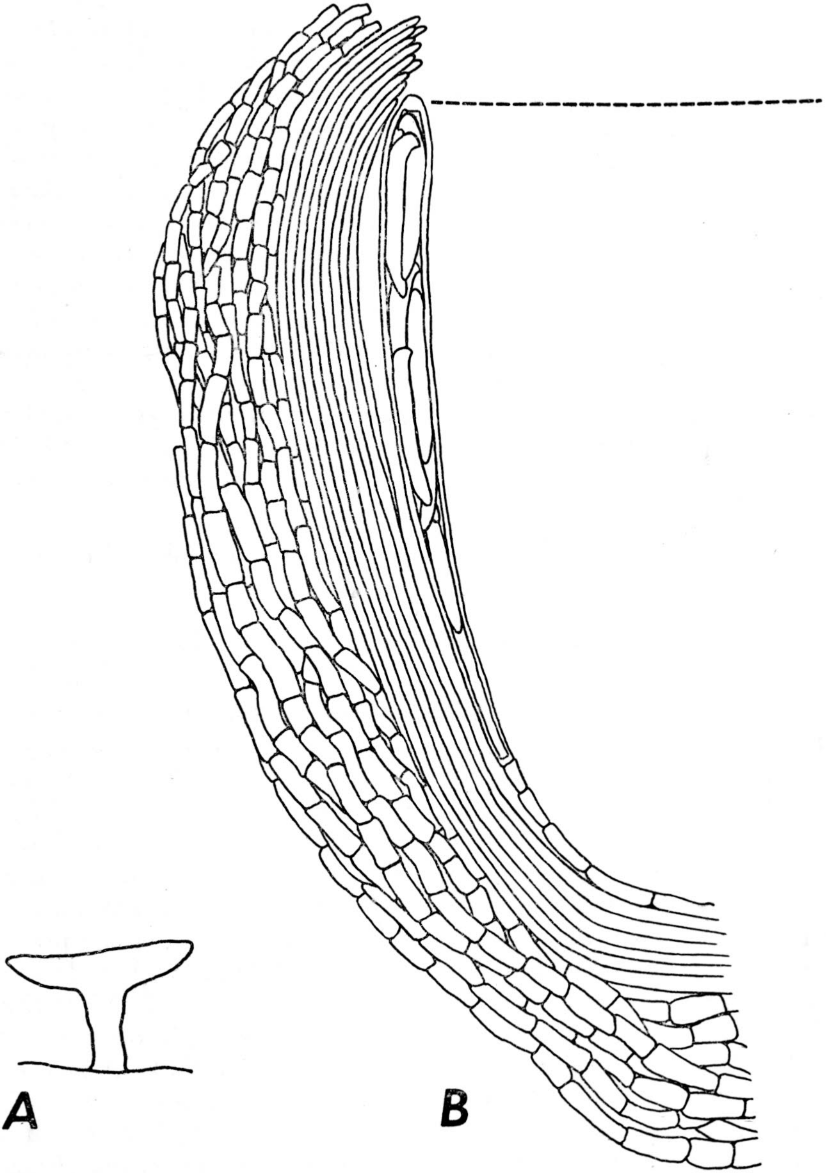

FIG. 3. *Hymenoscyphus serotinus,* Dumont-CO 1316, freehand drawing of median longitudinal sections of apothecia. A. Whole apothecium, x ca 20. B. Margin with ascus and 8 biseriate ascospores above and uniseriate below.

non-refractive, non-gelatinized, entire layer hyaline, frequently with metachromatic reaction visible in cotton blue dye, ca 12-22 µm broad toward the margin, to 25 µm broad toward the stipe, consisting predominately of textura prismatica with the individual hyphae parallel; the individual cells toward the margin 8-12 (-23) x 4-8 µm, 10-18 (-28) x 4-10 (-15) µm toward the stipe, the walls thin to rarely thick, hyaline, smooth. Outer covering layer present, 2-4 layers and 4-8 µm broad, the individual hyphae extending parallel to the surface of the apothecium, overlapping, the individual cells hyaline to lightly pigmented, the walls non-refractive, thin, hyaline to pigmented, smooth or rarely rough. Hairs absent. Margin generally poorly developed, narrow above, broader below, entire area hyaline, light gray to lightly pigmented, constructed similarly to the apothecial flank below, the individual cells smaller, or the rectangular cells absent and composed of hyphae originating in the inner ectal below. Stipe constructed similarly to the lower portion of the apothecial flank, usually staining light pink in Melzer's reagent toward the base; hairs present, more abundat toward the base, 8-70 µm long, 3-4 (-5) µm wide, (1-) 3-5 septate, the walls thin, to lightly pigmented, smooth or rarely roughened.

Habitat. Growing on leaves, herbaceous stems and woody substrata.

Holotype. If extant, not examined.

Selected illustrations. Dennis, Mycol. Pap. 62: 81, fig. 73, 1956.

Specimens examined. PANAMA: Prov. Cocle, base of Cerro Pilón, 5 km NE of El Valle, ca 2.200 ft, on herbaceous stem, 13 Jun. 1975, *K. P. Dumont, S. E. & S. M. Carpenter & S. A. Mori PA-140* (NY); Prov. Veraguas, lower slopes of Cerro Tuté, ca 8 km NE of Sta. Fe, on property of agricultural school Alto de Piedras, ca 2.000 ft, on herbaceous stem, 19 Jun. 1975, *K. P. Dumont, S. E. & S. M. Carpenter & S. A. Mori PA-821* (NY). COLOMBIA: Dpto. Cauca, Finca A. Castro, ca 5 km W of Popayán, road between Popayán and El Tambo, on wood, 14 Jul. 1974, *K. P. Dumont, J. H. Haines, J. M. Idrobo & L. F. Velásquez CO-1316* (COL, NY); Dpto. Cauca, Finca "El Bosque", vereda Guazabarita, El Tambo, on twig, 15 Jul. 1974, *K. P. Dumont, J. H. Haines, J. M. Idrobo & L. F. Velásquez CO-1345* (COL, NY); Dpto. Antioquia, Estación Forestal Experimental Piedras Blancas, Medellín, on leaf, 21 Jul. 1974, *K. P. Dumont & J. H. Haines CO-1782* (COL); Dpto. Cundinamarca, vicinity km post 40 from Zipaquirá, on the Zipaquirá-Pacho Rd, ca 2.500 m, on fern leaf, 8 Jun. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood & L. A. Molina CO-4348* (COL, NY). VENEZUELA: Edo. Aragua, ravine 3.9 km S of Rancho Grande, Parq. Nac. Henry Pittier, on the Rancho Grande-Maracay Rd, on petiole of *Inga* sp., 5 Jul. 1971, *K. P. Dumont, J. H. Haines & G. J. Samuels VE-1387* (NY); Edo. Aragua, ca 10 km above Maracay, on the Maracay-Choroní Rd, Parq. Nac. Henry Pittier, on midvein

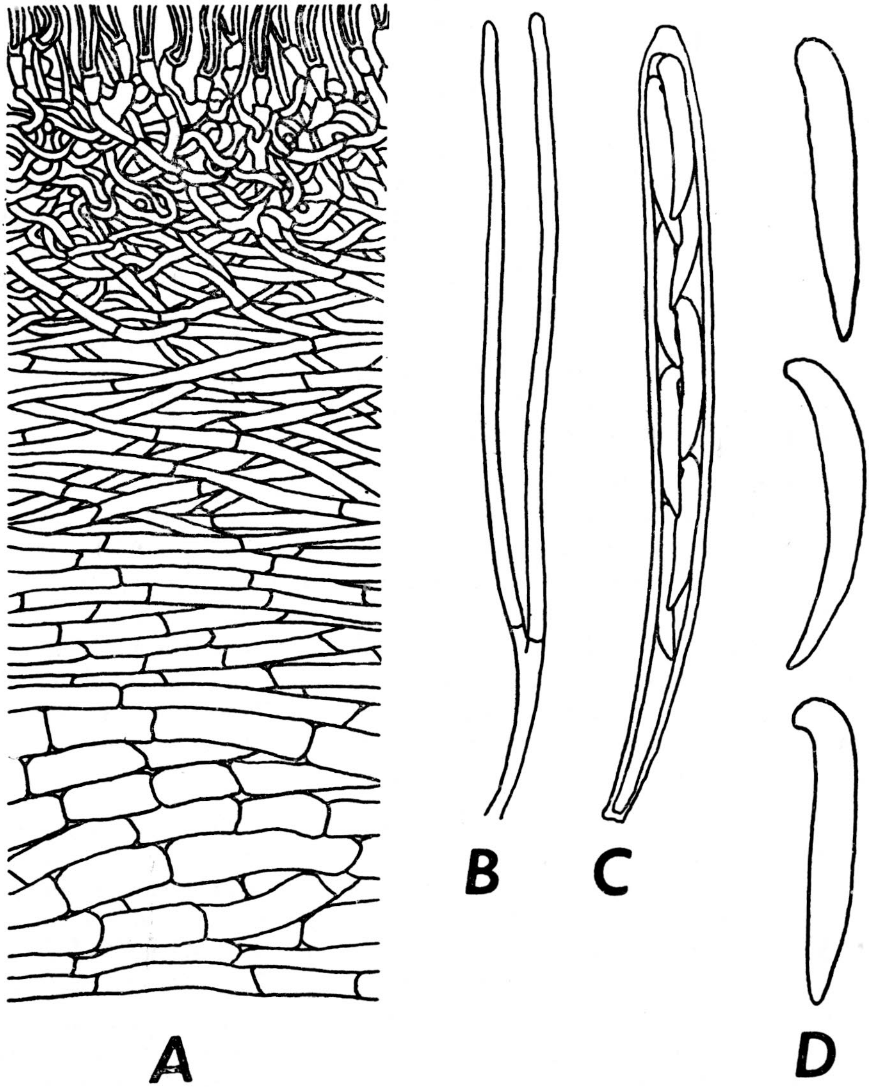

FIG. 4. *Hymenoscyphus serotinus,* Dumont-CO 1316, freehand drawings of median longitudinal sections of apothecia. A. Flank at approximately midpoint between margin and stipe, x 1.000. B. A branching paraphysis, x 1.000. C. An ascus with 8 biseriate ascospores, x 1.000. D. Three ascospores, x 2.000.

of leaf, 12 Jul. 1971, *K. P. Dumont, J. H. Haines* & *G. J. Samuels VE-1989* (NY); Edo. Miranda, vicinity Quebrada Los Palos Grandes, S facing slope of La Silla, Parq. Nac. El Avila, on leaf, 12 Jul. 1972, *K. P. Dumont, G. J. Samuels* & *B. Manara VE-3560* (NY); Edo. Miranda, vicinity refugio "No Te Apures", S facing slope of La Silla, Parq. Nac. El Avila, on leaf, 30 Jun. 1972, *K. P. Dumont, G. J. Samuels* & *B. Manara VE-3801* (NY); Edo. Monagas, vicinity of "Cueva del Guácharo", Caripe, on leaf, 18 Jul. 1972, *K. P. Dumont, R. F. Cain, G. J. Samuels* & *G. Morillo VE-5387* (NY); Dpto. Fed., along trail 1-2 km above Los Venados, El Avila, Parq. Nac. El Avila, on petiole of *Inga* sp., 24 Jul. 1972, *K. P. Dumont, R. F. Cain, G. J. Samuels* & *B. Manara VE-5983* (NY); Dpto. Fed., ca 25 km E of Colonia Tovar, on road between El Junquito and Colonia Tovar, on leaf, 29 Jul. 1972, *K. P. Dumont, R. F. Cain, G. J. Samuels* & *B. Manara VE-6417* (NY). ECUADOR: Border between Tungurahua and Pastaza Prov., ca 73 km from Ambato, on the Ambato-Puyo Rd, ca 4.800 ft, on herbaceous stem, 24 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1381* (NY).

Notes. Dennis (1956) described and illustrated *Hymenoscyphus serotinus* from European collections. It appears that the species was unknown to him from northern South America, since he did not include it in his 1970 work on Venezuelan fungi (Dennis, 1970). According to his concept, the apothecia are large, orange, restricted to woody substrata, and the ascospores are hooked apically, taper sharply and are 18-28 x 3-4 μm. Dennis considered collections with slightly narrower ascospores occurring on leaves to be referrable to *H. caudatus*. We have compared European material of *H. serotinus* with several of our collections from the neotropics occurring on leafy and woody material and find them to represent the same species.

Dennis (1956) indicated that *Hymenoscyphus serotinus* is "... perhaps no more than a form of *H. calyculus*". *Hymenoscyphus calyculus* (sensu Dennis) appears to be rather rare in the tropics and is known to us through only one collection, made by Dennis from Venezuela. Based on our studies we conclude that the two represent distinct, but closely related species. It should be noted that we have studied the holotype of *H. calyculus* and conclude that it is *Poculum firmum* (Persoon ex Gray) Dumont, a member of the Sclerotiniaceae also occurring on wood. *Hymenoscyphus calyculus* (sensu Dennis) thus represents a different species, and it is probable that in the future a name change will be required. This must be left to someone who is more familiar with the nomenclature and taxonomy of *Hymenoscyphus* than we are.

From the material which we have studied, we further conclude that *Hymenoscyphus serotinus* is very closely related to *H. caudatus*. See *H. caudatus* for a complete discussion of relationships.

Although the apothecial anatomy of collections of *Hymenoscyphus serotinus* studied does vary, the variability of the sterile tissues and hymenial elements falls within the normal expected range for a given species. However, we have observed considerable variation of gross morphological features which is worthy of mention. The apothecia vary from tiny (ca 0.5 mm diam) and light yellow on leaves to larger and dark brown to nearly black on herbaceous stems. On woody substrata such as small twigs, branches, and small longs, the apothecia become larger (to ca 5 mm diam) and very from apricot, orange, yellow-orange to red-orange. However, microscopically the tiny apothecia growing on leaves cannot be separated from the large, brown apothecia on woody substrata. We are unable to fully explain this variability, but it does seem to be a reaction or adaptation by the fungus to a change in substrata or environment. We do not have evidence to support recognition of subspecific taxa and conclude that *H. serotinus* is a variable species occurring in at least northern South America and Europe on woody and leafy substrates.

The presence of hairs on the stipe of this species appears to be a somewhat unstable character. In general the hairs are abundant at the base of the stipe and can be observed in the field. However, in at least three collections (CO-1782, VE-1387, VE-1989) hairs were not observed or were extremely scarse in mounts made for microscopic examination. Although the microanatomy of *H. serotinus* remains rather consistant, mention should be made of one collection, which in all features would fall into an acceptable range of variation, except for the size of the ascospores. In Dumont PA-1629 the ascospores are 32-38 x 5-6 μm. Since we have observed this large variation only once, we do not feel confident in describing a new taxon, as it may merely represent a "monstrosity". Another interesting variant, possibly representative of a new taxon, is represented by Dumont PA-680 and CO-4647. The gross morphology and sterile tissue of these two collections fall within the concept of *H. serotinus*, but the ascospores are very different. At the posterior end of the ascospores, they frequently produce minute "bottle brush" cilia. The spores are also larger than *H. serotinus*, 35-43 x 5-8 μm.

Additional specimens studied. PANAMA: Veraguas, lower slopes of Cerro Tuté, ca 8 km NE of Sta. Fe, on property of agricultural school Alto de Piedras, ca 2.000 ft, on herbaceous stem, 19 Jun. 1975, *K. P. Dumont, S. E. & S. M. Carpenter & S. A. Mori PA-680* (NY); Prov. Chiriquí, Oak Forest, Cerro Respingo, ca 6 km NW of Town of Cerro Punta, ca 7.500 ft, on branch, 2 Jul. 1975, *K. P. Dumont & S. E. Carpenter PA-1629* (NY). COLOMBIA: Dpto. Boyacá, vicinity km post 115, on the Chocontá-Aguaclara Rd, ca 4.000 ft, on long, 10 Jul. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood & L. A. Molina CO-4647* (COL, NY).

3. "**Hymenoscyphus** affin. **scutulus**" (Persoon) Phillips, British Discom. p. 136. 1887.

Basionym: *Peziza scutula* Persoon, Mycol. Eur. *1:* 284. 1822.

Apothecial morphology. Apothecia variable, gregarious, stipitate,0.5-1.0 mm in diam, 0.75-1.5 mm high, when fresh disc flat, drying flat, rehydrating flat to convex. Hymenium when fresh light brown, beige to off-white, drying black to dark ochraceous, rehydrating light brown, tan or beige; margin when fresh, dry, and rehydrated concolorous with hymenium; receptacle when fresh concolorous with or slightly lighter than hymenium, drying as hymenium or lighter and then red-ochraceous, rehydrating concolorous with or lighter than hymenium; stipe cylindrical, broader above and tapering slightly towar the base, to 1 mm long, to ca 0.25 mm wide, above when fresh, dry and rehydrated concolorous with lower portion of receptacle, below lighter than receptacle, frequently furfuraceous at the base.

Apothecial anatomy. Asci 8-spored, 80-120 x 6-8 μm, produced from tiny croziers, long cylindric-clavate, gradually tapering to the base and there not becoming expanded to form a small foot, wall ca 1 μm thick, enlarged at the papillate to subtruncate apex and there 1-2 (-3) μm thick, pore J +, the walls faint blue, and two basal dots staining darker in Melzer's reagent. Ascospores (16-) 18-22 (-26) x 2-3 (-4) μm, biseriate throughout, hyaline, smooth, aseptate, fusoid, anterior end rounded, curved, and generally hooked, posterior end becoming drawn out into a fine point and producing a 1-2 μm long cilium; in outline inequilateral, flattened on one surface, anterior end slightly broader, anterior guttules larger than posterior, spherical to irregularly shaped, filling major portion of spores and separated by a narrow band of cytoplasm. Paraphyses equal to or slightly exceeding the asci, internally pigmented, the pigmentation oily, resinous yellow to reddish blue-black, branching not determined, septate , filiform, becoming slightly expanded at the apex and there 1-2 (-3) μm wide, walls thin, smooth or rarely roughened. Subhymenium not well differentiated from medullary excipulum, but with a zone to ca 25 μm broad in the center with the hyphae somewhat more tightly compact and narrower than the medullary excipulum. Medullary excipulum well developed, non-refractive, hyaline, consisting of septate, branched, loosely to tightly interwoven hyphae 2-5 μm wide, the walls thin, non-refractive, hyaline, smooth. Ectal excipulum: inner ectal excipulum well to poorly defined, well differentiated from the outer ectal excipulum and grading into medullary excipulum, entire layer non-refractive, hyaline to lightly pigmented, to ca 10 μm wide toward the margin and to ca 50 μm toward the stipe, consisting of tightly compact, parallel to slightly interwoven, hyaline, lightly pigmented hyphae 2-4 (-7) μm wide, the walls thin, non-refractive, hyaline, smooth. Outer ectal excipulum non-refractive, non-gelatinized, entire layer hyaline, to ca 15 μm

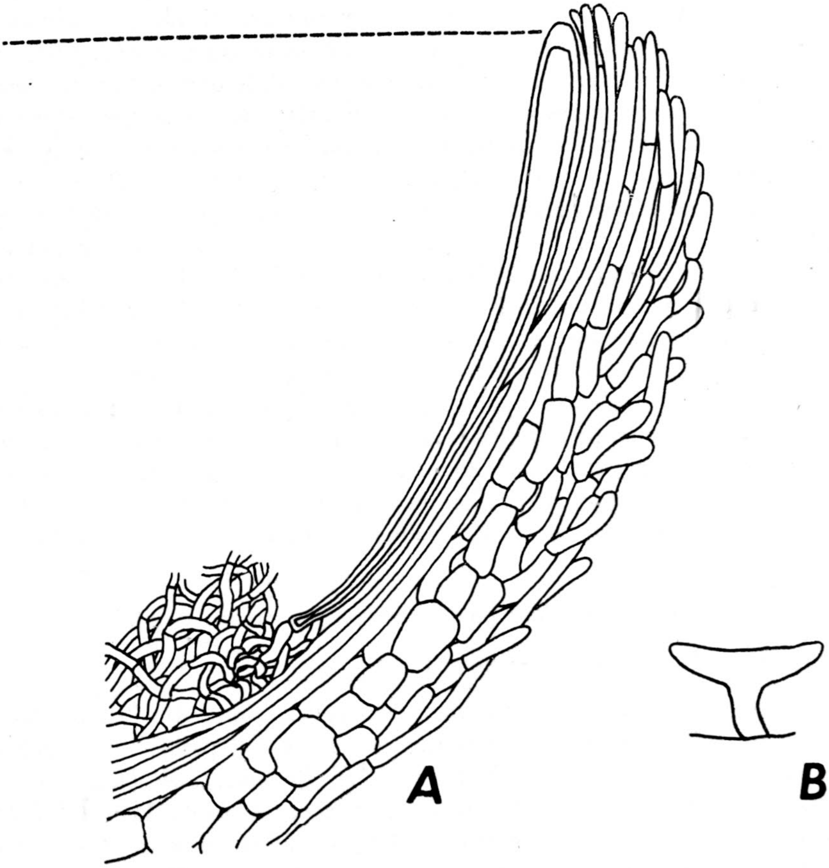

FIG. 5. *Hymenoscyphus* affin. *scutulus*, Dumont-VE 3556, freehand drawings of median longitudinal sections of apothecia. A. Margin with an immature ascus, x 1.000. B. Whole apothecium, x ca 20.

broad toward the margin, to ca 30 μm broad toward the stipe, consisting predominately of textura prismatica; the individual cells occasionally loosing hyphal orientation and appearing irregular and angular, with the individual hyphae extending parallel or at low to high angles to the surface of the apothecium; the individual cells toward the margin frequently cuboid, 5-12 x 5-12 μm toward the stipe, the walls thin to rarely thick, hyaline, smooth. Outer covering layer present, 2-4 layers and 3-6 μm broad, the individual hyphae extending parallel to the surface of the apothecium, overlapping, terminating before the margin and the apically free cells unmodified, the individual cells intensely pigmented, the pigmentation oily, resinous yellow to reddish blue-black, as in the paraphyses, the walls non-refractive, thin, hyaline to pigmented, smooth to finely rough. Hairs absent. Margin well to poorly developed, narrow above, broader below, entire area light gray lightly pigmented, constructed similarly to the apothecial flank below, the individual cells smaller, the apically free cells not noticeably modified, occasionally the rectangular cells absent and then composed of narrow hyphae originating in the inner ectal excipulum below. Stipe constructed similarly to the lower portion of the apothecial flank, to the outside an outer covering layer of narrow, hyaline to pigmented hyphae, to the inside a zone of parallel hyphae with hyaline, brick-shaped cells grading into longer and narrower cells in the central core; hairs present, more abundant toward the base, arising perpendicularly from the surface of the apothecium, 5-22 (-40) μm long, 2-4 (-6) μm wide, the walls thin to thick, hyaline to subhyaline, smooth to finely roughened.

Habitat. Leaf petioles, leaf blades, herbaceous stems, twigs.

Holotype. If extant, not examined.

Specimens examined. PUERTO RICO: Mayagüez, along Río Nuevo Pasos, Dr. Luis Roure's property near Rosario, ca 140 m, on petiole of *Tabebuia heterophylla*, 17 Jun. 1970, *R. P. Korf, J. B. Benson, J. R. Dixon, J. H. Haines, D. H. Pfister, A. Y. Rossman, A. Sánchez & L. E. Skog CUP-PR 4186* (CUP, MAPR, NY). COLOMBIA: Dpto. Cundinamarca, ca 16 km from El Colegio, on the Bogotá-El Colegio Rd, vía Salto de Tequendama, on herbaceous stem, 28 Feb. 1976, *K. P. Dumont CO-4013* (COL, NY). VENEZUELA: Edo. Miranda, vicinity Quebrada Los Palos Grandes, S facink slope of La Silla, Parq. Nac. El Avila, on petiole, 2 Jul. 1972, *K. P. Dumont, G. J. Samuels & B. Manara VE-3556* (NY, VEN); Edo. Miranda, vicinity Quebrada Los Palos Grandes, S facing slope of La Silla, Parq. Nac. El Avila, on twig, 2 Jul. 1972, *K. P. Dumont, G. J. Samuels & B. Manara VE-3624* (NY); Edo. Miranda, vicinity Quebrada Los Palos Grandes, S facing slope of La Silla, Parq. Nac. El Avila, on leaf, 2 Jul. 1972, *K. P. Dumont, G. J. Samuels & B. Manara VE-3629* (NY); Edo. Miranda, vicinity Quebrada Los Palos

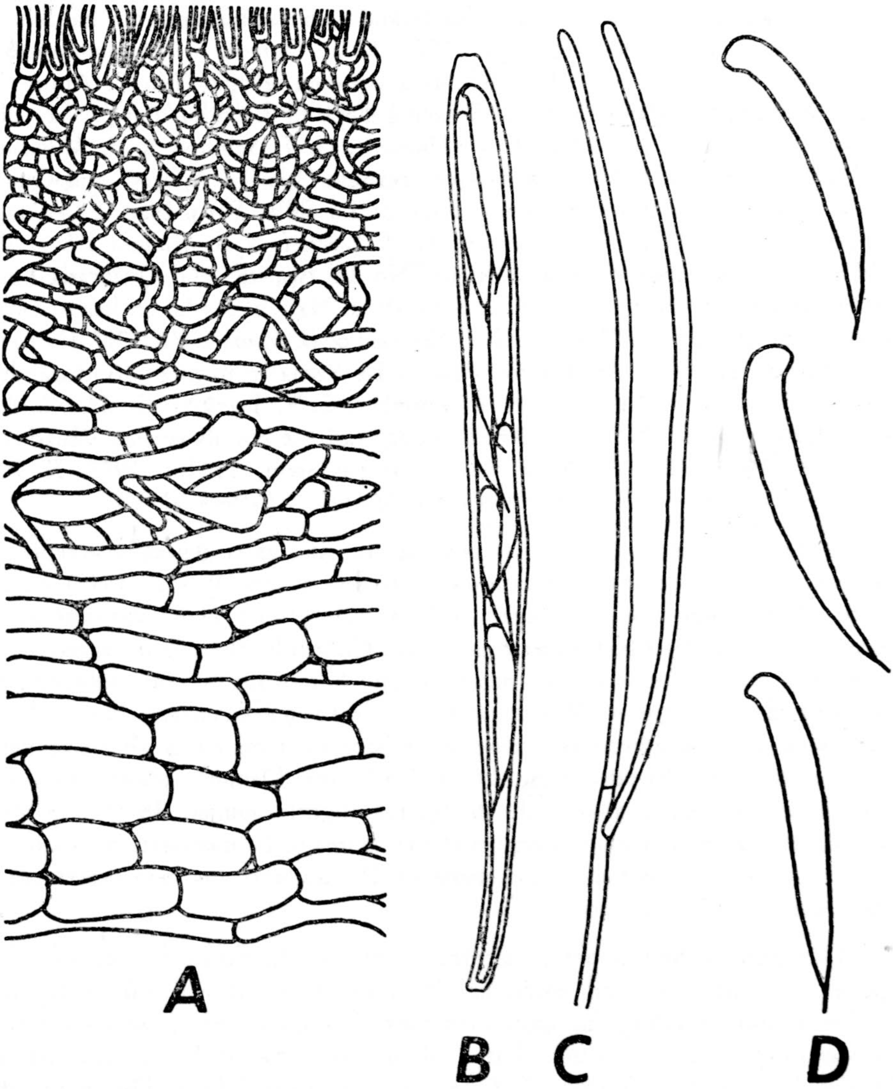

FIG. 6. *Hymenoscyphus* affin. *scutulus*, Dumont-VE 3556, freehand drawings of median longitudinal sections of apothecia. A. Flank at approximately midpoint between margin and stipe, x 1.000. B. An ascus with 8 biseriate ascospores, x 1.000. C. A paraphysis, x 1.000. D. Three ascospores, x 2.000.

Grandes, S facing slope of La Silla, Parq. Nac. El Avila, on petiole, 2 Jul. 1972, *K. P. Dumont, G. J. Samuels* & *B. Manara VE-3635* (NY); Edo. Miranda, vicinity Quebrada Los Palos Grandes, S facing slope of La Silla, Parq. Nac. El Avila, on twig, 1 Jul. 1972, *K. P. Dumont, G. J. Samuels* & *B. Manara VE-3665* (NY); Edo. Miranda, between refugio "No Te Apures" and Quebrada Los Palos Grandes, S facing slope of La Silla, Parq, Nac. El Avila, on petiole, 1 Jul. 1972, *K. P. Dumont, G. J. Samuels* & *B. Manara VE-3693* (NY); Edo. Miranda, between refugio "No Te Apures" and Quebrada Los Palos Grandes, S. facing slope of La Silla, Parq. Nac. El Avila, on petiole, 1 Jul. 1972, *K. P. Dumont, G. J. Samuels* & *B. Manara VE-3710* (NY); Edo. Miranda, between refugio "No Te Apures" and Quebrada Los Palos Grandes, S facing slope of La Silla, Parq. Nac. El Avila, on herbaceous stem, 1 Jul. 1972, *K. P. Dumont, G. J. Samuels* & *B. Manara VE-3711* (NY); Edo. Sucre, trail from Los Pocitos through La Roma to town of Río Grande Arriba, on wood, 13 Jul. 1972, *K. P. Dumont, G. J. Samuels, G. Morillo* & *J. Farfán VE-5020* (NY); Dto. Fed., along trail 1-2 km above Los Venados, El Avila, Parq. Nac. El Avila, on herbaceous stem, 24 Jul. 1972, *K. P. Dumont, R. F. Cain, G. J. Samuels* & *B. Manara VE-5944* (NY).

Notes. As Dennis (1956) has pointed out, and as is generally accepted, *Hymenoscyphus scutulus* is an extremely variable species. White (1942) gave a partial synonymy for the species and has shown that many varieties and forms have been described under this species. Currently, there is no agreement as to how the species should be delimited and how many, if any, subspecific taxa should be recognized. White (1942) included in his concept those collections with yellow apothecia occurring on herbaceous stems and with ascospores with or without cilia measuring 18-24 x 4-5 μm. Dennis' concept (1956) appears to be very similar with the spores slightly longer, 18-27 x 3.5-5. It appears that both authors considered the spores to be inequilateral, slightly kooked at the apex, but more the shape of *H. caudatus* (as here described), than those of *H. serotinus*.

Our purpose here is not to atempt to unravel the detailed limits of this species, but rather to add additional information which will aid in future studies in understanding this species complex. The species which we have here, *Hymenoscyphus* affin. *scutulus* has a cilium like those of *H. scutulus* sensu Dennis, but the shape is that of *H. serotinus* as reported here. The spores of this taxon are narrower than those of the ones reported for *H. scutulus* in the literature.

As understood here, *Hymenoscyphus* affin. *scutulus* varies little in gross morphological and anatomical features. One collection Dumont VE-4410 appears to represent another taxon. The ascospores are much larger than the present taxon. The spore shape is also similar to that of *H. caudatus*.

Additional specimens studied. VENEZUELA: Edo. Sucre, ca ½ hour walk along trail N of Manacal, NW of Irapa, on herbaceous stem, 9 Jul. 1972, *K. P Dumont, R. F. Cain, G. J. Samuels, G. Morillo & J. Farfán VE-4410* (NY).

4. **Hymenoscyphus lasiopodium** (Patouillard) Dennis, Persoonia, **2:** 190. 1962.

Basionym: *Belonidium lasiopodium* Patouillard, Bull. Soc. Mycol. France *16:* 184. 1900.

Apothecial morphology. Apothecia variable, solitary or rarely gregarious, stipitate, 1-1.5 mm in diam, 1-1.5 mm high, when fresh disc flat to convex, drying concave to flat, rehydrating flat to rarely concave. Hymenium when fresh yellow, yellow-orange, light beige, drying straw-yellow, rehydrating lighter; margin when fresh, dry and rehydrated concolorous with hymenium; receptacle when fresh lighter than hymenium and light yellow to pallid, drying straw yellow or lighter than hymenium, rehydrating pallid; stipe cylindrical broader above and tapering slightly toward the base, to ca 1 mm long, ca .5 mm wide, above and below when fresh, dry and rehydrated concolorous with lower portion of receptacle.

Apothecial anatomy. Asci 8-spored, (90-) 110-115 (-130) x 6-8 (-10) μm, produced from small croziers, long cylindric-clavate, gradually tapering to the base and there becoming expanded to form a small foot or rounded, wall to 1 μm thick, enlarged at the broadly rounded to subtruncate apex and there 1-2 (-3) μm thick; pore walls J +, the walls outlined faint blue, and with two basal dots obvious in Melzer's reagent. Ascospores (20-) 24-30 (-35) x 4-5 (-6) μm, biseriate throughout or biseriate above and uniseriate below, hyaline, frequently becoming brown with age, generally 3 (-5) septate, ends pointed or rarely rounded, in outline inequilateral, flattened on one surface, anterior end generally slightly broader, posterior end frequently becoming slightly drawn out; guttules irregularly shaped, and generally filling major portion of each cell of spore and separated by a narrow septum. Paraphyses equal to or exceeding the asci by 10-15 μm, internally hyaline or with internal, yellow to golden granules, most easily visible in Melzer's reagent, rarely branching at the base of the asci, sparingly septate, filiform, becoming slightly expanded at the apex or not and there 1.5-2 (-3) μm wide, walls thin, smooth, hyaline. Subhymenium not well differentiated from medullary excipulum, poorly developed, hyaline to light gray in the center to ca 20 μm, consisting of minute croziers and generally tinghtly interwoven hyphae, the individual hyphae difficult to discern, hyaline, 1-1.5 μm wide, the walls thin, smooth. Medullary excipulum well developed, obconical, non-refractive, hyaline, consisting of septate, branched, loosely to tightly

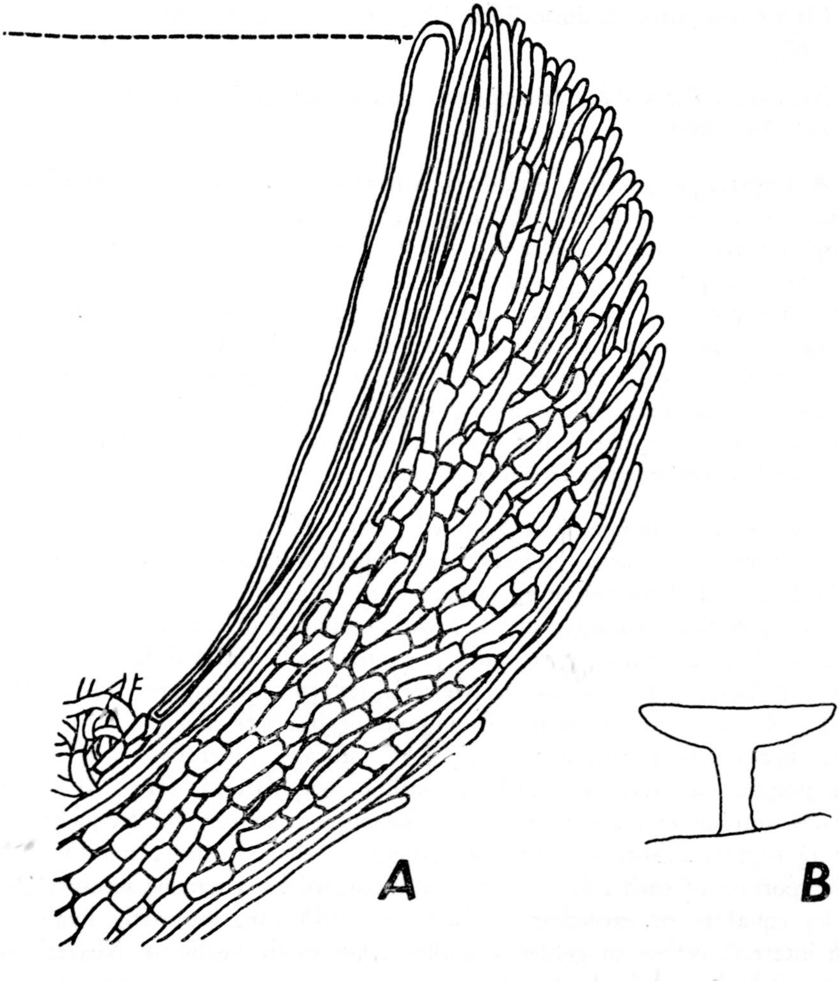

FIG. 7. *Hymenoscyphus lasiopodium,* Dumont-VE 5842, freehand drawings of median longitudinal sections of apothecia. A. Margin with an immature ascus, x 1.000. B. Whole apothecium, x ca 20.

interwoven (co parallel in the flank and toward the margin) hyphae 1-4 (-6) µm wide, the walls thin and non-refractive or thick and refractive below flanks, smooth. Ectal excipulum: inner ectal excipulum poorly defined, undifferentiated from the medullary excipulum. Outer ectal excipulum non-refractive, non-gelatinized, entire layer hyaline, staining faint pink in Melzer's reagent, consisting predominately of textura prismatica, the individual hyphae extending parallel or at a low angle to the surface of the apothecium, the individual cells occasionally becoming disrupted and losing hyphal orientation, 10-40 x 8-15 µm, the walls thin or more commonly thick, hyaline, smooth. Outer covering layer present, occasionally becoming detached from surface of apothecium and appearing naked, consisting of hyphae seeming to originate in the outer ectal excipulum, 1-3 layers and 2-8 µm broad, the individual hyphae extending parallel to the surface of the apothecium, overlapping teminating before the margin and the apically free cells unmodified, the individual cells hyaline, light gray to lightly pigmented, frequently filled with yellow to golden-yellow granules as in paraphyses, the walls non-refractive, thin or rarely thick, hyaline, light gray, smooth. Margin well developed, narrow above, broader below, entire area hyaline to light gray, constructed similarly to the apothecial flank below, the individual cells smaller. Stipe in the upper portion constructed similarly to the lower portion of the apothecial flank, at approximately midpoint constructed similarly to the flank, but individual cells longer and narrower, staining pink in Melzer's reagent, the outside covered with hairs, especially toward the lower portion; hairs ca 20-70 µm long, 3-4 µm wide, the walls thin, hyaline to light brown, roughened or smooth.

Habitat. On decorticated, generally wet wood, or more rarely on herbaceous stems, most frequently encountered in spray areas of stream or waterfalls or in very wet areas.

Holotype. Apparently no longer extant; was not located at the following herbaria: PBI, FH, K, NY, PC, S.

Selected illustrations. Dennis, Kew Bull. 1954: 332, fig. 41. 1954 (as *Belonidium hirtipes* A. L. Smith).

Specimens examined. JAMAICA: St. Andrew Parish, near Dick's Pond, W of Hardwar Gap, near Holywell Recreation Area, ca 2.800-3.000 ft, on wood, 11 Jan. 1971, *R. J. Korf, J. R. Dixon, K. P. Dumont, R. W. Erb, D. H. Pfister, D. R. Reynolds, A. Y. Rossman* & *G. J. Samuels CUP-MJ 331* (CUP, NY); St. Andrew Parish, near Dick's Pond, W of Hardwar Gap, near Holywell Recreation Area, ca 2.800-3.000 ft, on wood, 11 Jan. 1971, *R. P. Korf, J. R. Dixon, K. P. Dumont, R. W. Erb, D. H. Pfister, D. R. Reynolds, A. Y. Rossman* & *G. J. Samuels CUP-MJ 350* (CUP, NY); St. Andrew Parish, trail between Freetown and Wag Water River, near Hardwar

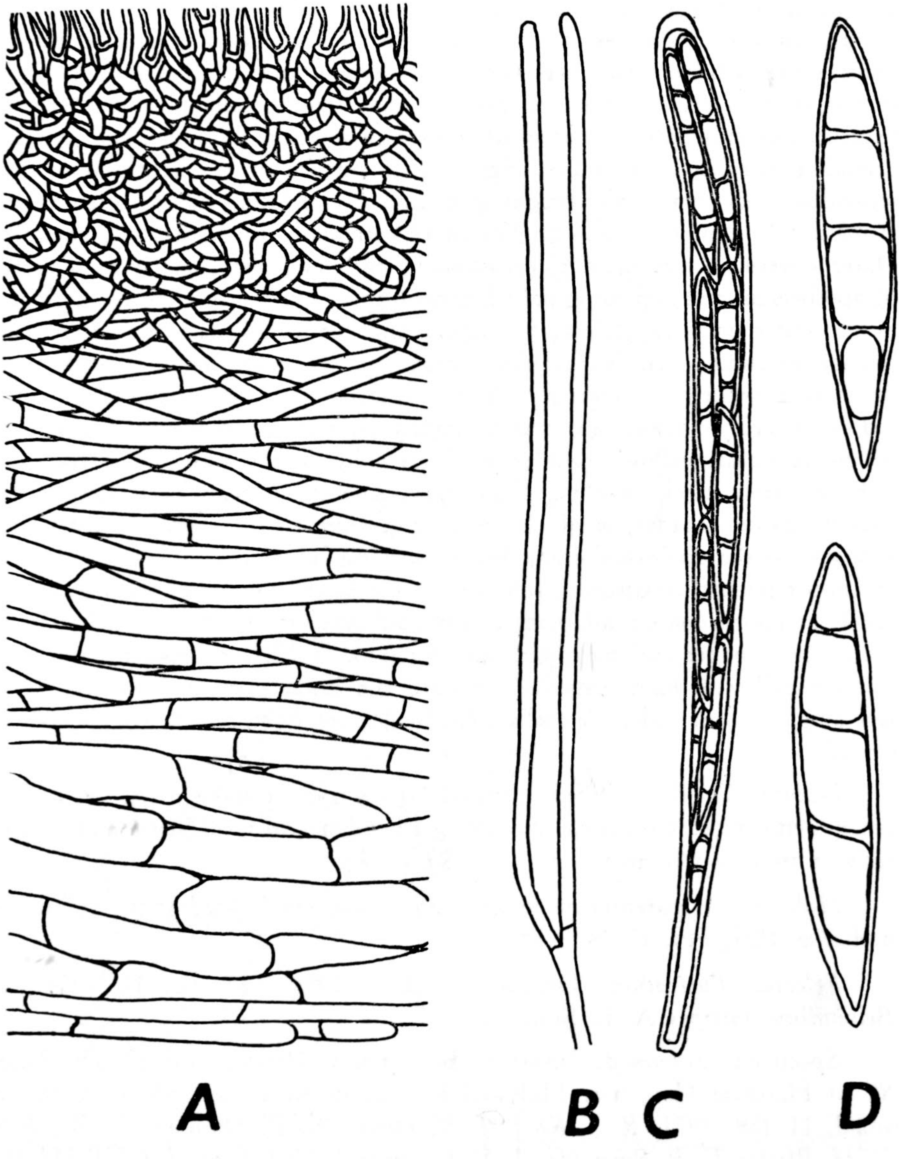

FIG. 8. *Hymenoscyphus lasiopodium,* Dumont-VE 5842, freehand drawings of median longitudinal sections of apothecia. A. Flank at approximately midpoint between margin and stipe, x 1.000. B. A branching paraphysis, x 1.000. C. An ascus with 8 biseriate, septate ascospores, x 1.000. D. Two septate ascospores, x 2.000.

Gap, on wood, 18 Jan. 1971, *R. P. Korf, J. R. Dixon, K. P. Dumont, R. W. Erb, D. H. Pfister, D. R. Reynolds, A. Y. Rossman & G. J. Samuels CUP-MJ 615* (CUP, NY); St. Andrew Parish, trail between Freetown and Wag Water River, near Hardwar Gap, on roots, 18 Jan. 1971, *R. P. Korf, J. R. Dixon, K. P. Dumont, R. W. Erb, D. H. Pfister, D. R. Reynolds, A. Y. Rossman & G. J. Samuels CUP-MJ 619* (CUP, NY). PANAMA: Prov. Veraguas, lower slopes of Cerro Tuté, ca 8 km NE of Sta. Fe, on property of agricultural school Alto de Piedras, ca 2.000 ft, on herbaceous stem, 19 Jun. 1975, *K. P. Dumont, S. E. & S. M. Carpenter & S. A. Mori PA-664* (NY). COLOMBIA: Dpto. Cundinamarca. El Robledal, 12 km from Pacho, road between Zipaquirá and Pacho, on wet twig in spray zone, 30 Jun. 1974, *K. P. Dumont, J. H. Haines & J. M. Idrobo CO-248* (COL, NY); Dpto. Valle, vicinity km 20 from Cali, road between Cali and Buenaventura, on wood, 13 Jul. 1974, *K. P. Dumont, J. M. Idrobo & L. F. Velásquez CO-1121* (COL, NY); Dpto. Valle, vicinity km 20 from Cali, road between Cali and Buenaventura, on wood, 13 Jul. 1974, *K. P. Dumont, J. M. Idrobo & L. F. Velásquez CO-1174* (COL, NY); Dpto. Cauca, along río Cauca, at junction of road from Popayán to Puracé and Popayán to Coconuco, on wood, 17 Jul. 1974, *K. P. Dumont, J. H. Haines, J. M. Idrobo & L. F. Velásquez CO-1577* (COL, NY); Dpto. Cundinamarca, ca 100 km from Bogotá, on the Bogotá-Villavicencio Rd, vía Cáqueza, ca 4.400 ft, on wet wood, 7 Jan. 1976, *K. P. Dumont, P. Buriticá & J. L. Luteyn CO-2279* (COL, NY); Dpto. Huila, ca 15 mi from Altamira, on the Altamira-Florencia Rd, ca 4.800 ft, on wet herbaceous stem, 15 Jan. 1976, *K. P. Dumont, P. Buriticá, J. L. Luteyn & L. A. Molina CO-2662* (COL, NY); Dpto. Huila, ca 15 mi from Altamira, on the Altamira-Florencia Rd, ca 4.800 ft, on roots, 15 Jan. 1976, *K. P. Dumont, P. Buriticá, J. L. Luteyn & L. A. Molina CO-2669* (COL, NY); Intendencia Caquetá, ca 32 mi from Florencia, on the Florencia-El Doncello Rd, ca 4.800 ft, on twig, 18 Jan. 1976, *K. P. Dumont, P. Buriticá, J. L. Luteyn & L. A. Molina CO-2968* (COL, NY); Intendencia Caquetá, ca 32 mi from Florencia, on the Florencia-El Doncello Rd, ca 4.800 ft, on herbaceous stem, 18 Jan. 1976, *K. P. Dumont, P. Buriticá, J. L. Luteyn & L. A. Molina CO-2988* (COL, NY); Intendencia Putumayo, vicinity km post 90 from Pasto, on the Pasto-Mocoa Rd, ca 8.200 ft, on monocot stem, 26 Jan. 1976, *K. P. Dumont, P. Buriticá, L. A. Molina & J. L. Luteyn CO-3659* (COL, NY); Intendencia Putumayo, vicinity km post 112 from Pasto, on the Pasto-Mocoa Rd, 8.000 ft, on wood & herbaceous stem, 28 Jan. 1976, *K. P. Dumont, P. Buriticá L. A. Molina & J. L. Luteyn CO-3839* (COL, NY); Dpto. Cundinamarca, vicinity km post 22 from Mosquera, on the Mosquera-La Mesa Rd, ca 8.400 ft, on wet wood, 7 Jun. 1976, *K. P. Dumont, S. E. Carpenter & M. A. Sherwood CO-4114* (COL, NY); Dpto. Cundinamarca, vicinity km post 40 from Zipaquirá, on the Zipaquirá-Pacho Rd, ca 2.500 m, on wet wood, 9 Jun.

1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood* & *L. A. Molina CO-4337* (COL, NY); Dpto. Cundinamarca, vicinity km post 36 from Zipaquirá on the Zipaquirá-Pacho Rd, ca 8.800 ft, on root, 9 Jun. 1976, *K. P. Dumont, S. E. Carpenter, L. A. Molina* & *M. A. Sherwood CO-4378* (COL, NY); Dpto. Cundinamarca, 21 km from Mosquera, on the Mosquera-La Mesa Rd, ca 2.300 m, on wet wood, 31 Jul. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood* & *A. Gentry CO-5429* (COL, NY); Dpto. Cundinamarca, ca 22 km from Bogotá, on the Bogotá-Choachí Rd, ca 9.200 ft on wet wood, 4 Aug. 1976, *K. P. Dumont, S. E. Carpenter* & *M. A. Sherwood CO-5543* (COL, NY); Dpto. Santander, ca 37 km from Bucaramanga, on the Bucaramanga-Pamplona Rd, ca 9.900 ft, on wet root, 21 Aug. 1976, *K. P. Dumont, M. A. Sherwood* & *L. F. Velásquez CO-7104* (COL, NY); Dpto. Santander, ca 37 km from Bucaramanga, on the Bucaramanga-Pamplona Rd, ca 9.900 ft, on wet wood, 21 Aug. 1976, *K. P. Dumont, M. A. Sherwood* & *L. F. Velásquez CO-7110* (COL, NY); Dpto. Valle del Cauca, ca 60 km from Ansermanuevo, on the Ansermanuevo-San José del Palmar Rd, ca 1.990 m, on log, 25 Aug. 1976, *K. P. Dumont, L. A. Molina, E. Forero, et al. CO-7221* (COL, NY); Dpto. Valle del Cauca, ca 60 km from Ansermanuevo, on the Ansermanuevo-San José del Palmar Rd, ca 1.990 m, on debris, 25 Aug. 1976, *K. P. Dumont, L. A. Molina, E. Forero, et al. CO-7224* (COL, NY); Dpto. Boyacá, along the Tunja-Ramiriquí-Páez Rd, in vicinity of km post 30 from the crossing of the Tunja-Nuevo Colón Rd, ca 8.200 ft, on wet wood, 14 Sep. 1976, *K. P. Dumont, P. Buriticá* & *M. I. Umaña CO-7890* (COL, NY). VENEZUELA: Edo. Miranda, El Edén, Parq. Nac. El Avila, on wood, 19 Jun. 1971, *K. P. Dumont, J. H. Haines* & *B. Manara VE-203* (NY); Dto. Fed., trail between Río Chiquito and Río Grande, above La Planta, Mt. La Naiguatá, on wet wood in spray zone, 25 Jun. 1971, *K. P. Dumont, J. H. Haines* & *B. Manara VE-648* (NY, NYS, VEN); Edo. Mérida, ca 60 km W of Mérida, on the Mérida-La Azulita Rd, La Carbonera, on log, in spray zone, 20 Jul. 1971, *K. P. Dumont, J. H. Haines, G. J. Samuels, S. Silverborg* & *L. Borjas VE-2490* (NY, NYS, VEN); Edo. Mérida, ca 63 km W of Mérida, Univ. Los Andes Forest Reserve, La Carbonera, on wet log, 20 Jul. 1971, *K. P. Dumont, J. H. Haines, G. J. Samuels, S. Silverborg* & *L. Borjas VE-2605* (NY); Edo. Mérida, above fish hatchery at La Mucuy, 7 km E of Tabay, Parq. Nac. Sierra Nevada, on wood, 26 Jul. 1971, *K. P. Dumont, G. J. Samuels* & *L. Borjas VE-3004* (NY, VEN); Edo. Táchira, along road between Zumbador and Quieniquea, on wood, 29 Jul. 1971, *K. P. Dumont, G. J. Samuels* & *L. Borjas VE-3345* (NY); Edo. Táchira, ca 13 km N of La Grita, on the La Grita-Mérida Rd, on herbaceous stem, 29 Jul. 1971, *K. P. Dumont, G. J. Samuels* & *L. Borjas VE-3399* (NY, VEN); Edo. Miranda, vicinity Quebrada Los Palos Grandes, S facing slope of La Silla, Parq. Nac. El Avila, on wood, 2 Jul. 1972, *K. P. Dumont, G. J. Samuels* &

B. Manara VE-3645 (NY, VEN); Dto. Fed., along trail 1-2 km above Los Venados, El Avila, Parq. Nac. El Avila, on wet wood, 24 Jul. 1972, *K. P. Dumont, R. F. Cain, G. J. Samuels* & *B. Manara VE-5842* (NY, VEN); Dto. Fed., along trail 1-2 km above Los Venados, El Avila, Parq. Nac. El Avila, on water soaked wood, 24 Jul. 1972, *K. P. Dumont, R. F. Cain, G. J. Samuels* & *B. Manara VE-5920* (NY, VEN); Dto. Fed., ca 19 km NE of Colonia Tovar, on road between Colonia Tovar and El Tigre, on wet wood, 29 Jul. 1972, *K. P. Dumont, R. F. Cain, G. J. Samuels* & *B. Manara VE-6567* (NY). ECUADOR: Prov. Pichincha, 2 km above Toachí, on the Toachí-Palo Quemado Rd, ca 3.400 ft, on wood, 19 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-605* (NY); Prov. Pichincha, 2 km above Toachí, on the Toachí-Palo Quemado Rd, ca 3.400 ft, on wood, 19 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-622* (NY); Prov. Cotopaxi, ca 98 km from Latacunga, on the Latacunga-Quevedo Rd, ca 8.000 ft, on wood, 23 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1118* (NY); Prov. Cotopaxi, ca 98 km from Latacunga, on the Latacunga-Quevedo Rd, ca 8.000 ft, on twig, 23 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1136* (NY); Prov. Cotopaxi, ca 100 km from Latacunga, on the Latacunga-Quevedo Rd, ca 5.200 ft, on wood, 23 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1228* (NY); Prov. Chimborazo, ca 46 km from Bucay (General Elizalde), on the Bucay-Riobamba Rd, ca 7.400 ft, on herbaceous stem, 28 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1585* (NY); Prov. Zamora, ca 1 km from Zamora, on the Zamora-Loja Rd, ca 3.600 ft, on wood, 1 Aug. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1875* (NY); Prov. Morona Santiago, ca 9 km from Limón (General Plaza Gutiérrez), on the Limón-Méndez Rd, ca 3.800 ft, on branch, 3 Aug. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-2105* (NY); Prov. Pichincha, ca 36 km from Quito, on Quito-Tandayapa Rd, ca 8.000 ft, on wood, 6 Aug. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-2331* (NY); Prov. Pichincha, ca 24 km from the junction of the Quito-Machachí Rd, on the new road from Quito to St. Domingo, ca 8.900 ft, on wood, 7 Aug. 1975, *K. P. Dumont* & *P. Buriticá EC-2356* (NY); Prov. Pichincha, ca 39 km from the junction of the Quito-Machachí Rd, on the new road from Quito to Sto. Domingo, ca 6.200 ft, on herbaceous and monocot. stem, 7 Aug. 1975, *K. P. Dumont* & *P. Buriticá EC-2408* (NY); Prov. Pichincha, ca 39 km from the junction of the Quito Machachí Rd, on the new road from Quito to Sto. Domingo, ca 6.200 ft, on grass debris, 7 Aug. 1975, *K. P. Dumont* & *P. Buriticá EC-2418* (NY). PERU: Dpto. Junín, ca ½ hour drive from Calabaza toward Concepción, on the Satipo-Concepción Rd, ca 7.000 ft, on wet wood, 28 Jun. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood* & *P. Buriticá PE-318* (NY, USM); Dpto. Junín, ca ½ hour from Calabaza toward Concepción, on the Satipo-Concepción Rd, ca 7.000 ft, on wood, 28 Jun. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood* & *P. Buriticá PE-358* (NY, USM); Dpto. Huánuco, ca 38 km from Tingo María, on the Tingo-María-Pucallpa Rd, ca 5.200 ft, on wet wood, 7 Jul. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood* & *P. Buriticá PE-726* (NY, USM); Dpto. Cuzco, along the Cuzco-Pilcopata-Paucartambo Rd, at a point ca 165 km from the intersection with the Cuzco-Puno Rd, on wet wood, 18 Jul. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood* & *P. Buriticá PE-1526* (NY, USM); Dpto. Cuzco, along the Cuzco-Pilcopata-Paucartambo Rd, at a point ca 165 km from the intersection with the Cuzco-Puno Rd, on wet wood, 18 Jul. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood* & *P. Buriticá PE-1578* (NY, USM).

Notes. Hymenoscyphus lasiopodium is one of the most commonly encountered species of *Hymenoscyphus* which we have collected in the neotropics. Typically it grows on decorticated wood in spray zones of streams or waterfalls or in very wet areas, and is easily characterized by its habitat, small yellow apothecia with a hairy apothecial base, and 3-septate ascospores.

The anatomical and morphological features of this species remain relatively consistent. The most noticeable variants are in those collections such as Dumont VE-3076 in which the ascospores become tardily 3-septate. In one collection Dumont VE-3822, the ascospores appear very different and are clavate reniform and become constricted at the septa.

The apothecial structure of *H. lasiopodium* is very similar to that of *H. caudatus, H. serotinus* and *H.* affin. *scutulus,* and its apothecia could be confused with those of the latter three, which produce small, yellow apothecia. *Hymenoscyphus lasiopodium* is most easily distinguished from the other three by its 3-septate ascospores. *Hymenoscyphus lasiopodium* appears to be most closely related to *H. sclerogenus.* In general, the former is found on wood and has 3-septate ascospores, and the latter grows on herbaceous stems, leaves, and rarely on woody substrate and has non-septate ascospores. The two are similar microanatomically and the rarely encountered apothecia of *H. sclerogenus* with 3-septate ascospores on wood can most easily be separated from *H. lasiopodium* by the structure of their asci. In *H. lasiopodium* the apex of the asci are narrow and characteristically broadly truncate, while in *H. sclerogenus* they are papillate. Further, the ascospores of the former lack the staining "nuclear area" of the ascospores of *H. sclerogenus.*

Additional specimens studied. VENEZUELA: Edo. Barinas, ravine ca 80 km NW of Barrancas, on the Mérida-Barinas Rd, on wet wood, 26 Jul. 1971, *K. P. Dumont, G. J. Samuels* & *L. Borjas VE-3076* (NY, VEN); Edo. Miranda, vicinity refugio "No Te Apures", S facing slope of La Silla, Parq. Nac. El Avila, on wet wood, 30 Jun. 1972, *K. P. Dumont, G. J. Samuels* & *B. Manara VE-3822* (NY).

5. **Hymenoscyphus sclerogenus** (Berkeley & Curtis in Berkeley) Dennis, Persoonia, **2:** 190. 1962.

Basionym: *Peziza sclerogena* Berkeley & Curtis in Berkeley, J. Linn. Soc., Bot. *10:* 369. 1868.

Apothecial morphology. Apothecia variable, solitary or rarely gregarious, stipitate, 0.5-1 mm in diam, 0.5-1 mm high, when fresh disc flat, drying flat to convex, rehydrating concave to flat. Hymenium when fresh yellow, drying darker yellow, rehydrating pale straw; margin when fresh, dry and rehydrated concolorous with hymenium; receptacle when fresh, dry and rehydrated similar to hymenium; stipe cylindrical, tiny, above when fresh, dry and rehydrated concolorous with receptacle.

Apothecial anatomy. Asci 8-spored, (105-) 110-120 (-125) x 7-9 (-10) µm produced from small croziers, long cylindric-clavate, gradually tapering to the base and there becoming expanded to form a smalls foot, wall 1-2 µm thick, enlarged at the rounded to truncate apex and there 2-2.5 (-3) µm thick; pore wall J +, the walls light blue in Melzer's reagent. Ascospores (22-) 26-30 (-35) x 3-4 (-6) µm, irregularly biseriate throughout or biseriate above and uniseriate below, hyaline, smooth, aseptate or rarely 1 or 3 septate, fusoid to subfusoid and rarely sigmoid, ends pointed or less commonly somewhat rounded, in outline inequilateral, flattened on one surface, anterior end frequently slightly broader; guttules irregularly shaped, filling major portion of spores and separated by a narrow band of cytoplasm; in the central area of the spore a globose to irregular, staining "body" 1.5-2.0 µm wide, possibly nuclear in origin. Paraphyses equal to or slightly exceeding the asci by 5-10 (-15) µm, internally hyaline or frequently with golden yellow contents, branching at the base of the asci, septate, filiform, becoming slightly expanded at the apex and there 2-2.5 µm, walls thin, smooth, hyaline. Subhymenium not well differentiated from medullary excipulum, poorly developed, hyaline to subhyaline, in the center to ca 30 µm, as narrow as 15 µm toward the margin, consisting of generally tightly interwoven hyphae, the individual hyphae hyaline lo light gray, 1-2 (-3) µm wide, the walls thin, hyaline, smooth occasionally with a metachromatic, violaceous reaction in cotton blue. Medullary excipulum well developed, obconical, non-refractive, hyaline, consisting of septate, branched, loosely to tightly interwoven (to parallel in the flank and toward the margin) hyphae (1-) 2-4 (-6) µm wide, the walls thin or rarely thick, non-refractive, hyaline, smooth. Ectal excipulum: inner ectal excipulum well to poorly defined, well differentiated from the outer ectal excipulum and grading into the medullary excipulum, entire layer non-refractive, hyaline to 14 µm wide toward the margin and to 28 µm toward the stipe, consisting of tightly compact, parallel to slightly interwoven, hyaline hyphae (1-) 2-3 µm wide, the walls thin, non-refractive, hyaline,

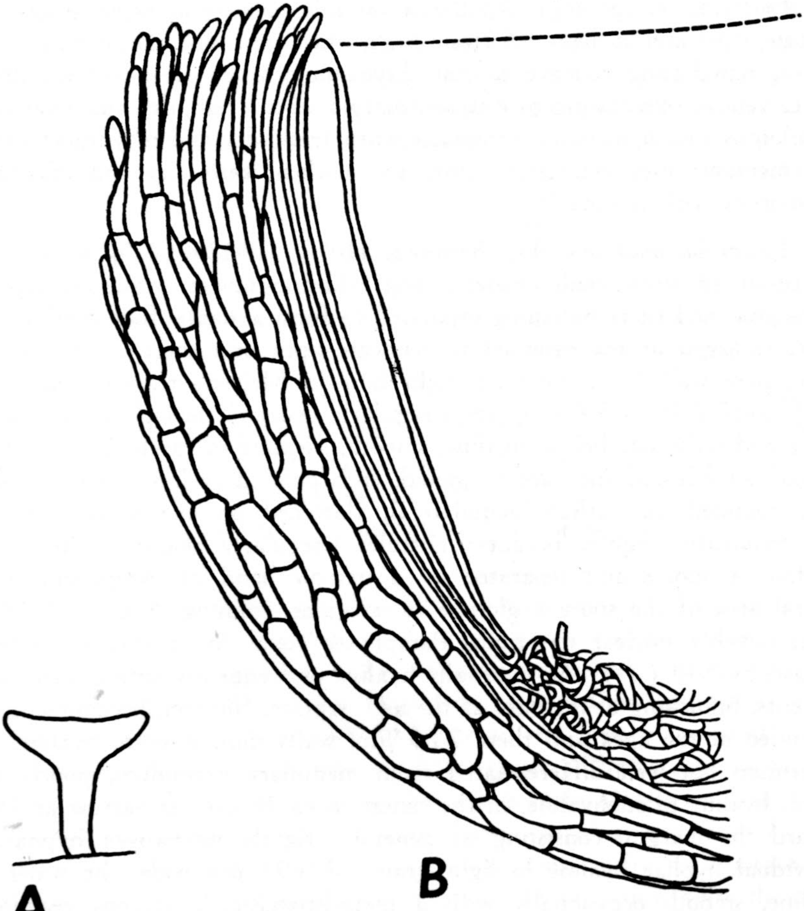

FIG. 9. *Hymenoscyphus sclerogenus,* Dumont-CO 1086, freehand drawings of median longitudinal sections of apothecia. A. Whole apothecium, x ca 20. B. Margin with an immature ascus, x 1.000.

smooth. Outer ectal excipulum non-refractive, non-gelatinized, entire layer hyaline, consisting predominately of textura prismatica with the individual hyphae extending parallel or at a low angle to the surface of the apothecium; the individual cells toward the margin 8-22 x 4-7 (-9) μm and 12-28 x 5-9 (-13) μm toward the stipe, the walls thin to thick, hyaline, smooth. Outer covering layer present, occasionally becoming detached from surface of apothecium and appearing naked, consisting of 1-2 (-3) layers and to 8 μm broad, the individual hyphae extending parallel to the surface of the apothecium, overlapping, terminating before the margin and the apically free cells unmodified, the individual cells hyaline, the walls non-refractive, thin, light gray to lightly pigmented, smooth to very finely roughened; frequently with golden yellow contents as in the paraphyses. Margin well developed, narrow above, broader below, entire area hyaline, constructed similarly to the apothecial flank below, the individual cells smaller, the apically free cells not becoming noticeably modified. Stipe in the upper portion constructed similarly to the lower portion of the apothecial flank; at approximately midpoint constructed similarly to the flank; except with the presence of hairs and the outermost cells becoming shortened and broader, the cells to the inside narrower and longer; base of the stipe staining pink in Melzer's reagent; hairs present, 8-52 μm long, 3-4 μm wide at the apex, 3-5 μm at the basal septum which frequently becomes enlarged, the walls thin, light gray to lightly pigmented, smooth to finely roughened.

Habitat. Most commonly encountered on herbaceous stems, less commonly found on leaf parts, twigs and woodsy substrata.

Selected illustrations. Dennis, Kew Bull. 1954: 332, fig. 40. 1954 (as *Belonidium sclerogenum*).

Holotype. Cuba, on palm petioles, no date given, C. Wright 754 (K).

Specimens examined. CUBA: holotype of *Peziza sclerogena* (see data above). PANAMA: Prov. Panamá, vicinity Alto de Pácora, 26-31 km N of Panamerican Highway, on old road to Mandinga, ca 2.100-2.200 ft, on frond of palm, 30 Jun. 1975, *K. P. Dumont, S. E. Carpenter & S. A. Mori PA-1605* (NY). COLOMBIA: Dpto. Cundinamarca, Quebrada Aguas Blancas, road between Sibaté and Fusagasugá, on herbaceous stem, 1 Jul. 1974, *K. P. Dumont, J. H. Haines & J. M. Idrobo CO-328* (COL); Dpto. Valle, vicinity km 20 from Cali, road between Cali and Buenaventura, on leaf, 13 Jul. 1974, *K. P. Dumont, J. M. Idrobo & L. F. Velásquez CO-1086* (COL, NY); Dpto. Valle, vicinity km 20 from Cali, road between Cali and Buenaventura, on leaf of *Heliconia* sp., 13 Jul. 1974, *K. P. Dumont, J. M. Idrobo & L. F. Velásquez CO-1145* (COL, NY); Dpto. Cauca, W slope of Cordillera Occidental, road between El Tambo and Veinte de Julio, on leaf, 16 Jul. 1974, *K. P. Dumont, J. H. Haines, J. M. Idrobo* & *L. F. Velásquez CO-1503* (COL, NY); Intendencia Caquetá, ca 57 mi from Florencia, on the Florencia-Altamira Rd, ca 7.400 ft, on herbaceous stem, 20 Jan. 1976, *K. P. Dumont, P. Buriticá, J. L. Luteyn* & *L. A. Molina CO-3116* (COL, NY); Intendencia Putumayo, vicinity km post 75-76 from Pasto, on the Pasto-Mocoa Rd, ca 8.200 ft, on herbaceous stem, 26 Jan. 1976, *K. P. Dumont, P. Buriticá, L. A. Molina* & *J. L. Luteyn CO-3590* (COL, NY); Intendencia Putumayo, vicinity km post 75-76 from Pasto, on the Pasto-Mocoa Rd, ca 8.200 ft, on monocot stem, 26 Jan. 1976, *K. P. Dumont, P. Buriticá, L. A. Molina* & *J. L. Luteyn CO-3612* (COL, NY); Intendencia Putumayo, vicinity km post 75-76 from Pasto, on the Pasto-Mocoa Rd, ca 8.200 ft, on herbaceous stem, 26 Jan. 1976, *K. P. Dumont, P. Buriticá, L. A. Molina* & *J. L. Luteyn CO-3627* (COL, NY); Dpto. Cundinamarca, ca 27-28 km from Mosquera, on the Mosquera-La Mesa Rd, on herbaceous stem, 28 Feb. 1976, *K. P. Dumont CO-4021* (COL); Dpto. Boyacá, ca 62 km from Aguazul, on the Aguazul-Sogamoso Rd, ca 5.600 ft, on herbaceous stem, 14 Jun. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood* & *L. A. Molina CO-5356* (COL, NY); On the boundry Dptos. Chocó and Antioquia, on the Medellín-Quibdó Rd, at a point ca 130 km from the intersection with Medellín-Anserma Rd, ca 3.900 ft, on herbaceous stem, 7 Aug. 1976, *K. P. Dumont, S. E. Carpenter* & *M. A. Sherwood CO-5569* (COL); On the boundry Dptos. Chocó-Antioquia, on the Medellín-Quibdó Rd, at a point ca 130 km from the intersection with the Medellín-Anserma Rd, ca 3.900 ft, on herbaceous stem, 7 Aug. 1976, *K. P. Dumont, S. E. Carpenter* & *M. A. Sherwood CO-5605* (COL); Dpto. Antioquia, ca 25 km from Medellín, on the Medellín-Turbo Rd, ca 7.400 ft, on wood, 14 Aug. 1976, *K. P. Dumont, S. E. Carpenter* & *M. A. Sherwood CO-6449* (COL, NY); Dpto. Santander, ca 34 km from Bucaramanga, on the Bucaramanga-Pamplona Rd, ca 9.300 ft, on wet wood, 21 Aug. 1976, *K. P. Dumont, M. A. Sherwood* & *L. F. Velásquez CO-7134* (COL, NY); Dpto. Boyacá, along the Tunja-Ramiriquí-Páez Rd, in the vicinity of km post 86 from the crossing of the Tunja-Nuevo Colón Rd, ca 5.100 ft, on twig, 13 Sep. 1976, *K. P. Dumont, P. Buriticá* & *M. I. Umaña CO-7816* (COL). VENEZUELA: Edo. Aragua, 44-45 km from Caracas, on El Junquito-Colonia Tovar Rd, on vine, 22 Jun. 1971, *K. P. Dumont, J. H. Haines* & *E. Moreno VE-427* (NY, NYS, VEN); Edo. Lara, along road, 12-17 km S & E of Sanare, Parq. Nac. Yacambú, on wood, 9 Jul. 1971, *K. P. Dumont, J. H. Haines, G. J. Samuels* & *J. Leal VE-1749* (NY); Edo. Mérida, El Pino, 16 km E of Apartaderos, on Mérida-Barinas Rd, on petiole of *Gunnera* sp., 19 Jul. 1971, *K. P. Dumont, J. H. Haines* & *G. J. Samuels VE-2411* (NY, NYS, VEN); Dto. Fed., ca 25 km E of Colonia Tovar, on road between El Junquito and Colonia Tovar, on palm stem, 29 Jul. 1972, *K. P. Dumont, R. F. Cain, G. J. Samuels* & *B. Manara VE-6395* (NY). ECUADOR: Prov. Pichincha, ca 55 km from

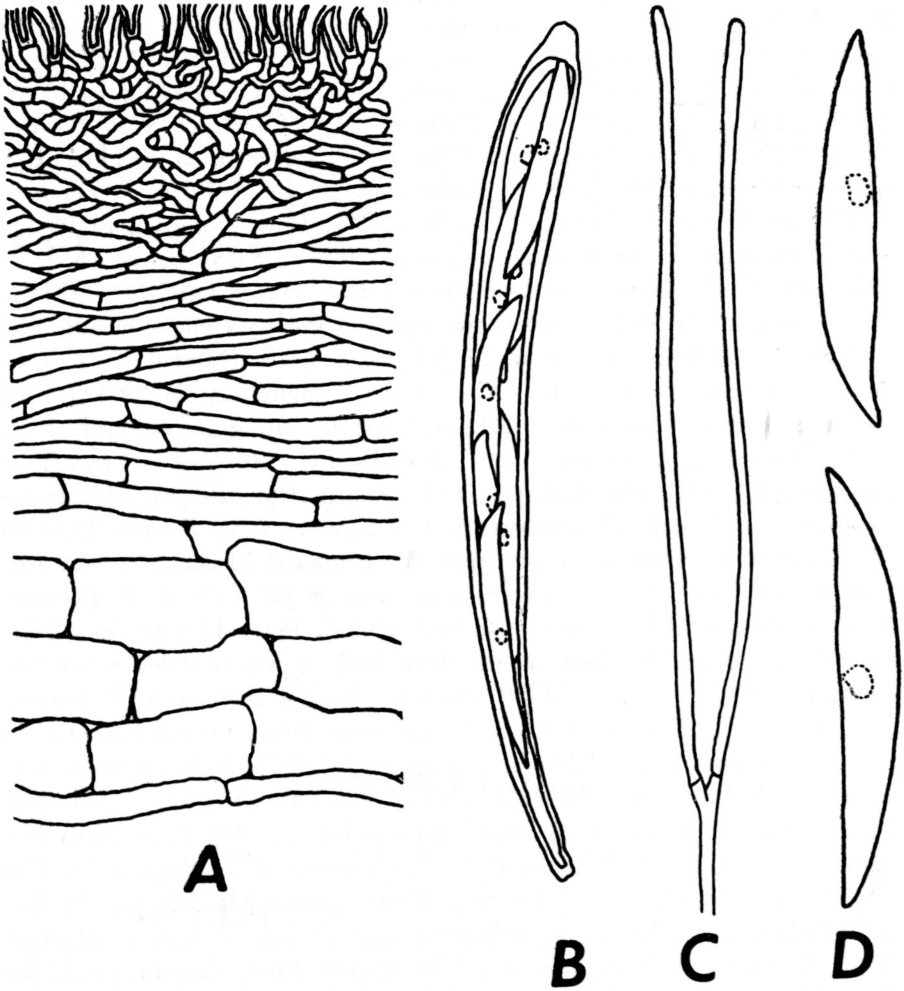

FIG. 10. *Hymenoscyphus sclerogenus,* Dumont-CO 1086, freehand drawings of median longitudinal sections of apothecia. A. Flank at approximately midpoint between margin and stipe, x 1.000. B. Ascus with 8 biseriate ascospores, x 1.000. C. A branching paraphysis, x 1.000. D. Two ascospores with "nuclear staining areas" indicated by broken line, x 2.000.

Sto. Domingo, on the new road from Quito to Sto. Domingo, ca 6.000 ft, on debris, 18 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-428* (NY); Prov. Pichincha, vicinity of cooper mine "La Plata", 3 km above Palo Quemado, which is ca 10 km above Toachí, ca 5.200 ft, on roots, 18 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-501* (NY); Prov. Cotopaxi, ca 87 km from Latacunga, on the Latacunga-Quevedo Rd, ca 10.000 ft, on grass, 23 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1075* (NY); Prov. Cotopaxi, ca 87 km from Latacunga, on the Latacunga-Quevedo Rd, ca 10.000 ft, on herbaceous stem, 23 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1078* (NY); Prov. Cotopaxi, ca 98 km from Latacunga, on the Latacunga-Quevedo Rd, ca 8.000 ft, on wood, 23 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1111* (NY); Prov. Cotopaxi, ca 98 km from Latacunga, on the Latacunga-Quevedo Rd, ca 8.000 ft, on herbaceous stem, 23 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1148* (NY); Prov. Tungurahua, ca 59 km from Ambato, on the Ambato-Puyo Rd, ca 5.400 ft, on ? grass, 24 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1332* (NY); Prov. Tungurahua, ca 59 km from Ambato, on the Ambato-Puyo Rd, ca 5.400 ft, on twig, 24 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1358* (NY); Prov. El Oro, ca 14 km from Piñas, toward Machala, on the Arenillas-Loja Rd, ca 3.700 ft, on herbaceous stem, 28 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1657* (NY); Prov. El Oro, ca 17 km from Piñas, toward Machala, on the Arenillas-Loja Rd, ca 3.200 ft, on herbaceous stem, 29 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1717* (NY); Prov. El Oro, ca 17 km from Piñas, toward Machala, on the Arenillas-Loja Rd, ca 3.200 ft, on twig, 29 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1721* (NY); Prov. El Oro, ca 21 km from Piñas, toward Machala, on the Arenillas-Lojas Rd, ca 2.400 ft, on herbaceous stem, 29 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1740* (NY); Prov. El Oro, ca 21 km from Piñas, toward Machala, on the Arenillas-Loja Rd, ca 2.400 ft, on herbaceous stem, 29 Jul. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1748* (NY); Prov. Zamora, ca 22 km from Zamora, on the Zamora-Loja Rd, ca 5.800 ft, on herbaceous stem, 1 Aug. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1923* (NY); Prov. Zamora, ca 22 km from Zamora, on the Zamora-Loja Rd, ca 5.800 ft, on twig, 1 Aug. 1975, *K. P. Dumont, S. E. Carpenter* & *P. Buriticá EC-1930* (NY); Prov. Pichincha, ca 39 km from junction of the Quito-Machachí Rd, on the new road from Quito to Sto. Domingo, ca 6.200 ft., on herbaceous stem, 7 Aug. 1975, *K. P. Dumont* & *P. Buriticá EC-2419* (NY). PERU: Dpto. Cuzco, along the Cuzco-Pilcopata-Paucartambo Rd, at a point ca 113 km from the intersection with the Cuzco-Puno Rd, on wet twig, 19 Jul. 1976, *K. P. Dumont, S. E. Carpenter, M. A. Sherwood & P. Buriticá PE-1940* (NY, USM).

Notes. The sterile tissue of *H. sclerogenus* is rather consistant and does not-vary noticeably. However, several of the characters of the ascospores do vary. For example, in general the ascospores are fusoid and non-septate, but occasionally 1 or 3-septate ascospores are found with rounded ends. Also, the ascospores are most commonly 26-30 μm long and 3-4 μm wide, but in Dumont EC-1263 and PA-488 the ascospores measure to 40 μm long and to 7 μm wide. We consider these to be merely a large-spored variant and not worthy of taxonomic recognition.

Hymenoscyphus sclerogenus is most closely related to *H. lasiopodium*. For a discussion of relationships see the latter. One collection Dumont CO-6320 although more like *H. sclerogenus* than *H. lasiopodium* appears to be intermediate between the two.

Additional specimens studied. PANAMA: Prov. Veraguas, along Panamá Highway 35 from Sta. Fe to Calovebora, ca 14 km from Sta. Fe, ca 1.900 ft, on herbaceous stem, 17 Jun. 1975, *K. P. Dumont, S. E. & S. M. Carpenter & S. A. Mori PA-488* (NY). COLOMBIA: Dpto. Antioquia, ca 136 km from Medellín, on the Medellín-Pto. Valdivia Rd, ca 6.900 ft, on bamboo culm., 13 Aug. 1976, *K. P. Dumont, S. E. Carpenter & M. A. Sherwood CO-6320* (COL, NY). ECUADOR: Prov. Tungurahua, ca 50 km from Ambato, on the Ambato-Puyo Rd, ca 5.400 ft, on herbaceous stem, 24 Jul. 1975, *K. P. Dumont, S. E. Carpenter & P. Buriticá EC-1263* (NY).

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